THE
EXCHANGERS'
MONTHLY

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General Characteristics and Physical Properties of Minerals.

By Thomas S. Ash.

By the word Mineral, we understand all substances found in nature which are homogeneous or of the same composition throughout their structure, and do not owe their origin to the action of animal or vegetable life.

This definition excludes all rocks which are variable in their character and composition, as well as all substances, such as coal, which are products of vegetable life. Some of these are, however, retained in most descriptions of minerals, though they do not strictly belong to the subject of Mineralogy.

The various members of the mineral kingdom which essentially differ from one-another, are divided into kinds or species. The majority of mineral substances are found to assume definite mathematical forms, bounded by plain surfaces and straight lines. These are called crystals.

Generally speaking, substances which differ in chemical composition from other substances, constitute distinct mineral species. Again, substances which agree in chemical composition but differ in their character of crystalline forms, are divided into separate mineralogical species. Thus, native gold, silver, and copper, which have the same crystalline form but differ in chemical composition, give three distinct species of minerals. Calcite and Aragonite have the same chemical composition, but differ in their crystalline form; one series belonging to the Rhombohedral and the other to the Orthorhombic system. Thus they constitute two distinct species. Difference in chemical composition, independently of crystalline form, or difference in the class, if of crystalline form, while the chemical composition remains the same, principally determines the division of minerals into species.

The crystalline form and chemical composition of minerals are the principal characteristics by which, when known, their specie and name may be discovered. Though these, in general, are sufficient for the identification of a mineral, yet, when the crystalline form is not apparent, or the chemical constitution can not be determined without great trouble, there are many characteristics which will enable us to describe and identify the species. The principal ones of these are the hardness, specific gravity, fracture, luster, color, brittleness, flexibility, malleability, taste, smell, and other natural properties of the substance. Sometimes the optical, magnetic, and electrical properties afford great assistance.

There are seventy accepted elementary bodies known. All species of minerals are formed by some one of these elements, or else are the result of their combination. The letters or symbols used in chemical science to designate elementary bodies, enables us to express, with great conciseness, the true chemical composition of any mineral; and the numbers which follow

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them, to determine the comparative weights of its component elements; thus :

ZnO represents the oxide of zinc, spartalite, consisting of one equivalent of zinc and one of oxygen.

FeS_2, iron pyrites, consisting of one equivalant of iron and two equivalents of sulphur.

Fe_2O_2, the red oxide of iron, or hematite, consisting of two equivalents of iron and three of oxygen. Pharmacosiderite, an arsenate of iron, is represented by a more complex symbol $3Fe_2O_3 + 2AsO_5 + 12H_2O$, showing that it consists of three equivalents of red oxide of iron, two of arsenic acid, and 12 of water. There are two methods of investigating the chemical composition of a mineral—the qualitative and the quantitative. The qualitative analysis determines the nature of the constituents, and the qualitative their relative proportions.

The comparative hardness of minerals is of great assistance in determining their specie, and it is a matter of great regret that this property has not been more accurately observed. The following scale was introduced by Mohs and is generally adopted to indicate the hardness of minerals :

1, Talc; 2, Rock-salt; 3, Calcite; 4, Fluorspar; 5, Apatite; 6, Feldspar: 7, Quartz; 8, Topaz; 9, Corundum; 10, Diamond.

The transparent or cleavable varieties are the best for this purpose. Care must be taken to use the specimen nearly of the same form, size, and be of great purity.

The streak is a property examined by scratching the mineral by a substance harder than itself, or when it is not too hard, by rubbing it upon a piece of unglazed porcelain or wedgewood. A writing diamond will scratch all other minerals, but a fragment of corundum, quartz, or a hard steel point, will be found sufficient. The scratch may be a rough or smooth line, and may be accompanied by the powder of the mineral.

The color of this powder determines the color of the streak.

[TO BE CONTINUED.]

Receipts.

Black Sealing Wax.—Purchase the best black resin, 3 lb., beeswax ½ lb., and finely powdered ivory black 1 lb. Melt the whole together over a slow fire, and make it into sticks.

Imitation Silver.—Eleven oz. refined nickel, 2 oz. metallic bismuth. Melt the composition three times, and pour them out in lye. The third time, when melting, add 2 oz. of pure silver.

Sure Corn Cure.—One-half oz. tincture of iodine, ½ oz. chloride of antimony, 12 grains iodide of iron; mix; pare the corn with a sharp knife; apply the lotion with a small pencil brush.

Russia Salve.—Take equal parts of yellow wax and sweet oil, melt slowly, carefully stirring; when cooling, stir in a small quantity of glycerine. Good for all kinds of wounds, etc.

Cement for Leather.—Virgin india rubber dissolved in bisulphide of carbon. Add bisulphide until of proper constituency to apply. After applying hold a moderately warm iron over the patch.

Paste that will not Sour.—Dissolve ½ an oz. of alum in a pint of boiling water, add an equal weight of flour, made smooth in a little cold water, and a few drops of oil of cloves, and let the whole come to a boil. Put it into glass jars. It will keep for months.

Oroide Gold.—The best article is made by compounding 4 parts pure copper, 1¾ parts pure zinc, ¼ part magnesia, 1-10 part sal ammoniac, 1-12 part quick-lime, and 1 part cream tartar. Melt the copper first, then add as rapidly as possible the other articles in the order named

Egyptian Cement.—Take 1 lb. of the best white glue, ½ lb dry white lead, 1 quart soft water, and ½ pint alcohol. Put the first three articles in a dish, and that dish in a pot of boiling water. Let it boil until dissolved, then add the alcohol, and boil again until mixed. This will be found an excellent cement for mending minerals.

To take Fac-similes vf Signatures.—Write your name on a piece of paper, and while the ink is wet, sprinkle over it some finely-powdered gum arabic, then make a rim around it, and pour on it some fusible alloy in a liquid state. Impressions may be taken from the plates formed in this way, by means of printing-ink and the copper-plate press.

Indelible Ink for Marking Linen.—Add caustic alkali to a saturated solution of cuprous chloride until no further precipitate forms; allow the precipitate to settle, draw off the supernatant liquid with a siphon and dissolve the hydrated copper oxide in the smallest quantity of ammonia. It may be mixed with about 6 per cent. of gum dexterine for use.

Minerals of Worcester Co., Mass.

ALTHOUGH my subject is Minerals of Worcester Co., I shall not attempt to give all the minerals in their different combinations as found in this County, but only those that are attractive or valuable.

Although this County seems rather barren of interesting minerals as compared with many sections of the United States, yet there are a few mineral localities within its borders that will compare favorably with the famous localities of other States.

The following are the minerals occurring at

Auburn.—At Tinker Hill silver mines, argentiferous galena, sphalerite, pyrite, and garnet. This mine was at one time worked for silver, but not paying, was abandoned.

Barre.—Rutile and Mica.

Bolton.—Wernerite (scapolite), both lilac and white, petalite, titanite, nuttalite, boltonite, yttrocerite, spinel, fassaite, calcite, sahlite, and rhomb-spar.

The above locality is well known to all mineralogists.

Millbury.—Ripidolite, actinolite, talc, and vermiculite.

This last mineral was first discovered in this town and not found elsewhere for years after. It was found in the bed of the Blackstone river. As it is now under water, it is impossible to obtain specimens.

Oxford.—At silver mine, pyrite, galena (argentiferous), blende, and mispickel (arsenopyrite).

Royalston.—Allanite, menaccanite, albite, and beryl.

The beryls of Royalston are noted for their beauty and purity. Some very fine specimens have been found here.

Sterling.—Spodumene, andalusite, siderite, chiastolite, and damourite (sterlingite).

The chiastolite of Sterling is widely celebrated.

Webster.—Dendrites, dolomite, hornblende (green), and just over the line, cube pyrites in steatite.

This last mineral makes quite a curious and attractive specimen.

Worcester.—Graphite, fluorite (purple), anthophyllite (hydrous), graphitic anthracite, calcite, and scapolite. At the silver mine, pyrite, galena, siderite, mispickel.

Many of the above minerals are in the Worcester Natural History Society. In many parts of the County but little is known in regard to its minerals, as many of its towns have been but partially explored.

J. J. ALTON.

The War-Point.

By JOSEPH WIGGLESWORTH.

I FIND that many young collectors are puzzled over the war-point. When they obtain one they do not know what it is, and exchange or pass it off as they do the more common arrowhead. The war-point is a three-cornered arrowhead without a shank. The shaft of the arrow was split, the war-point inserted, and then wrapped with the sinews of the deer. The first impulse of the person shot was to draw out the shaft, which always left the point to work its way in. As poisoned points were used, it can be supposed that the wounds always proved fatal. The war-points are of benefit to the Archæologist as in many cases they determine the locality of ancient battle-fields. Imperfect specimens are quite common, but fine perfect ones are extremely rare owing to their being so easily broken.

COCOANUT cellulose is a new substance, and if it possesses the quality claimed for it, England may go back to her wooden walls with safety and beat up her self-destructive rams for old iron. The patentees claim that a ship cannot be sunk by shot or shell if only she has taken the precaution of coming into the fight with this peculiar tissue as a great coat. When a shot, no matter what its dimensions, strikes the side of a frigate, the carpenter and his mate need not jump to cram in the old-time plugs, for the cellulose immediately closes, and a drop of water will not enter.

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At the suggestion of several of our subscribers, we will next month introduce a Correspondents' Column and hope its readers will avail themselves of it. We hope that the subscribers to this Monthly will bear in mind that it is published for them, and therefore we are willing to make any change which we believe will meet the approval of the majority of its subscribers. We also wish to impress on their minds that their duty does not end when they send their subscription, but that we shall expect them all to act as though they were shareholders in it, by sending us original articles, exchange notices, ads, etc., and when they are writing to their correspondents to mention the Monthly and try and secure subscriptions to it. By so doing they will not only help us but help themselves. Do not forget that the premiums for subscriptions only last until the first of February.

IF you are in need of a rubber stamp, you could not do better than send to R. W. FORD, of Bristol, Conn. He is cheaper than the cheapest, and furnishes a good stamp.

THE subject of Mr Ash's second paper, which will appear in the next number, will be "Specific Gravity, Double Refraction, and Polarized Light." He has also kindly offered to assist Mineralogical students who subscribe to this paper, free gratis, for which we return thanks. His address is 126 Chestnut Place, West Philadelphia, Pa. When writing to him do not forget to put in a stamp for return postage.

SANIDINE and Topaz in Nevadite, has been observed at Chalk Mountain, Colo., for which the formula $2(Be_2SiO_4) + H_2O$ has been proposed.

WITH this number we enroll Mr. Wigglesworth among its regular contributors, he having promised to write a paper for us each month, for which we return our thanks.

TOURMALINES can be extracted from a matrix, by soaking in cold water and tapping the crystals lightly with a small hammer.

WE would call the attention of our readers to our advertising columns and would state that all the parties whose ads appear in this monthly are trustworthy, and anybody knowing aught against any of them will do us a favor by informing us of it, as we will not under any circumstances accept adds from irresponsible parties. When answering ads do not forget to mention that you saw it in this Monthly.

A BORING made on Bedloe's island, in the examination of the foundation for the Bartholdi statue, failed to find rock at a depth of 50 feet from the surface. The material passed through for the first 15 feet was fine sand; the remaining 35 feet was hard, compact gravel, with some bowlders, as reported by Alex. C. Chenewith, C.E., under whose direction the work of clearing the foundation was done. The gneissic rock, so abundant in New York City, makes its appearance on the west bank of the Hudson, in Jersey City, and undoubtedly makes the west bank of the river channel down to Robbins' reef, but it must be somewhat below the bottom of this boring on Bedloe's island.

Mastodon Bones.

The bones of a half-grown mastodon was dug up last summer about 300 feet southwest from the depot at Corona, Bergen Co., N. J., by Mr. David Essex. They were in black earth and 2 or 3 feet beneath the surface. The bones were very much decayed so that but few of them could be recognized. There was a piece of a tusk, four or five inches long and two inches in diameter, and some broken teeth which were very much worn, and the crowns of some others which, probably, had never developed roots, and were still in the body of the jaws when the animal died. These crowns of teeth, which were in the most perfect preservation, were three and a half inches long, three inches wide, and about one and a half inches high.

Betrandite.

M. M. Damour and Bertrard have recently described a new mineral species from the neighborhood of Nantes. An analysis by Damour gave SiO_2 49·26, BeO 42·00, Fe_2O_3 1·40, H_2O 6·90 = 99·56. Orthorhombic, with a prismatic angle of 121° 20′. Crystals are generally tabular in habit through the extension of the basal plane or of the brachypinacoid. They are sometimes twins. The crystals are transparent colorless, slightly yellowish. Lustre brilliant, vitreous. Hardness a little less than 6. Specific gravity 2·586-2·593. The mineral occurs in cavities in Pegmatite, implanted on quartz or feldspar, with apatite, pyrite, or arsenopyrite.

Celluvert is a new material formed by passing paper, or any fibrous form of cellulose, through a bath of nitric acid. The glutinous surfaces so produced are then pressed together and washed, when they form an extremely tough and hard substance, which is well adapted for use in the industrial arts. It is proposed to construct dishes for use in photography out of celluvert, but it would also answer well for dark slides.

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Any one having common U. S. stamps to sell or exchange, or any special delivery stamps or Indian arrowheads to dispose of, write me stating quantity and price. I would like to have stamp, coin, egg, and curiosity collectors send me their address on a postal card. Also any one having U. S. revenue stamps to sell or exchange, write me giving price. GEO. W. HAVLIN, Dayton, Campbell Co., Ky., Box 18.

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Mound Builders of Henry Co., Indiana.

HENRY Co., Ind., contains some of the most noted works of the aborigines; though not many of them have been opened. The writer was present during the recent excavation of one of these mounds.

We commenced digging at the edge and dug a trench 2½ ft. wide and about 25 ft. long, or to the center of the mound; and were rewarded by the exhumation of some human bones, some pottery, and a small copper box. Other mounds have been opened in this County, and some very fine relics have been found.

We opened one on the Elliott farm, about 1 mile west of this town, Saturday, November 7, 1885, and were rewarded with a rich find, taking from one place a large human skeleton, seventy-five arrowheads, twenty beads, two pipes, a celts, a stone for dressing skins, a flint drill, two small pieces of slate, about 4×2¼ inches, dressed smooth, and a piece of bone with a small piece of copper through the center, that looked like a lead-pencil and was probably used for marking on the slates. There was also a piece of petrified wood around one of the wrist bones of the skeleton, which had been worn as an ornament.

There is a large mound on this farm that is said to contain valuable specimens of the Mound Builders' art; quite a number having already been taken therefrom. But as the present owners of the property wish to preserve the mound in its original state, it has been allowed to stand undisturbed.

GEO. W. PITMAN.

GEOLOGISTS find evidence of several successive glacial epochs, and it is quite possible that similar conditions may return and that all traces of life may disappear from the Northern parts of this country and Europe.

PATCHOULY is supposed to be the most permanent of all vegetable odors. The plant resembles mint and is a native of various parts of India.

SPECIAL OFFER.

In order to immediately place this monthly in the hands of every exchanger, we will make the following offer for new subscribers:

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Remember that these offers only last good until the First of February, as after once subscribing to this Monthly you will need no inducement to renew your subscription.

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Specific Gravity.

By Thomas S. Ash.

Equal volumes of different substances are frequently found to differ in their weight. To determine the relative weight, or specific gravity of equal volumes of substances, distilled water at a temperature of 60 degrees Fahrenheit, is taken as the standard unit of comparison. As it would be extremely difficult to obtain equal volumes of substances whose specific gravity is required, advantage is taken of the hydrostatical property, that a body immersed in water displaces a mass of water equal in volume to itself, and has its weight diminished by that of the volume of water it displaces. The specific gravity of a body being the ratio of its weight to an equal volume of distilled water, at a temperature of 60 degrees Fah. All we have to do to determine it, is to weigh the substance first in air, then in distilled water at 60 degrees Fah. For this purpose the hydrostatic balance is made use of.

The hydrostatic balance is an ordinary balance, the scale-pan of which is removed from one side, and replaced by a counterpoise, which balances the other scale-pan, under which is placed a hook, to which the substance to be weighed is suspended by a fine fiber, or better, a fine platinum wire. For accurate experiments the balance should be sufficiently delicate to weigh to the one-hundredth part of a grain.

Experiment.—Let A be the weight of a substance in the air, W its apparent weight when suspended in water, and SG its specific gravity; then, $SG = \frac{A}{A - W}$. When great accuracy is required, it may be necessary to take into account the weight of the mass of air displaced by the body when weighed in air. Since water is 815 times heavier than air, we must subtract from the specific gravity obtained above $\frac{W}{815\,(A - W)}$. Thus in a specimen of Cordierite, whose weight in air is 311.91 grains, weight in water 195.46 grains, the SG $= \frac{311.91}{311.91 - 195.46} = 2.678$. If we take into account the weight of the air displaced when it is weighed in the air, we must deduct from the above $\frac{195.46}{815 \times (311.91 - 195.46)} = .002$, which makes the correct specific gravity 2.676. The bubbles of air which attach themselves to the surface of the mineral when suspended in water, are removed by boiling the water in which it is suspended briskly for a few minutes, the whole being left to cool down to 60 degrees Fah. If the mineral be so light as to float on the water, a sinker of brass or some other substance whose apparent weight when suspended by itself in distilled water is B, is attached to it, so as to cause it to sink.

Experiment.—Let A be the weight of the light mineral, B that of the sinker suspended by itself in the distilled water, C the weight of A and B when suspended in water together; then in this case $SG = \frac{A}{A+B-C}$. Thus to find the specific gravity of a substance weighing 20 grains in the air, it is sunk by a weight which weighs 87.22 grains when immersed in water by itself; the two substances when suspended in water together weigh 23.89 grs. In this case we have $SG = \frac{20}{20 + 87.22 - 23.89} = \frac{20}{83.33} = .240$.

If the mineral can only be obtained in small fragments, or if it is supposed to contain vacuities, it must be reduced to a fine powder, and the specific bottle which is called a pygnometer, is made use of. This instrument is equally applicable for the determination of the specific gravity of solids or fluids. It consists of a very thin glass bottle of a globular shape, and is generally made to contain either 500 or 1000 grains of distilled water at 60 degrees Fah. It is furnished with a ground-glass stopper, which is pierced through the center with a straight hole of a very fine bore. The object of this is, that when the bottle is filled up to the neck with water or any other liquid, the stopper may be inserted, and the excess of the liquid escaping through the hole in the stopper, the bottle may be filled with a definite volume of liquid. Now, suppose our object is to find the specific gravity of a liquid, and we use the 1000 gr. bottle; we proceed as follows:

Having placed the empty bottle in one pan of the balance, we counterpoise it by a weight in the other pan; we then fill the bottle with a liquid at 60 degrees Fah., in the way described, wipe it dry, replace it in the scales, and restore the equilibrium by adding more weights. Therefore, the weight added is evidently that of the liquid; but as the same volume of water at 60 degrees Fah. weighs 1000 grs., if the bottle be accurately made, the specific gravity of the liquid is equal to its weight expressed in grains divided by 1000. As the bottles are seldom made with such accuracy as to contain exactly the right quantity of water, let W be the weight of the bottle full of air, W′ its weight filled with distilled water at 60 degrees Fah. Then making an allowance for the weight of the air contained in the bottle, the weight of the water contained in the bottle will be $\frac{815\,(W - W')}{814}$, and the weight of the bottle will be the difference between this quantity and W′. A piece of lead equal to this must be cut and kept as a counterpoise for the bottle. If a bottle which has thus been found to contain 500.72 grains of water, be counterpoised by a piece of lead, and filled with sea-water, weighs 516.86 grs., the specific gravity of the sea-water will be $\frac{516.86}{500.72}$, or 1.032. To determine the specific gravity of a powdered mineral, a known weight, M, of the substance is introduced into the pygnometer, which is then carefully filled with water and weighed. Let M be the weight of the mineral introduced, M′ the weight of the water it displaced in the pygnometer, w the weight of the water which the bottle would contain full, W the weight of the bottle filled with the mineral and water, the lead counterpoise for the weight of the bottle itself being in the opposite scale-pan. Then the specific gravity of the substance $= \frac{M}{M'}$, and $W = w + M - M'$, or $M' = w + M - W$, and therefore $SG = \frac{M}{w + M - W}$. Let 86.02 grains of a mineral be introduced into the pygnometer found to contain 500.72 grs. of water, and the bottle filled with distilled water, let it then weigh 554.74 grains; then,

$$SG = \frac{86.02}{500.72 + 86.02 - 554.74} = 2.688.$$

For all minerals in a state of average purity the specific gravity is one of the most important and constant characteristics. Every chemical analysis of a mineral should be accompanied by a careful determination of its density.

[TO BE CONTINUED.]

SEVERAL thousand Nemalite specimens have been quarried in the serpentine and trap ridges of New Jersey by Prof. Leeds of Stevens Institute.

Purgatory.

By J. J. Alton.

This is a remarkable chasm situated in the town of Sutton, Mass., 16 miles from Worcester, and is a wild and extremely picturesque spot. It is said to be the greatest natural curiosity in the New England States, and if it is not the greatest, it is certainly an interesting place and well worth a long journey to see. I visited this interesting place last fall and will endeavor to give a description of my trip.

We started quite early in the morning and had a very pleasant ride, 10 miles of it being over a pleasant country road. Two miles from Purgatory we left the main road, taking a narrow cart path, which was very rocky, but this served to prepare us for a much more wild and rocky scene at the end of our journey.

As we neared the chasm the scenery changed, for we now entered thick woods and passed many large masses of rock, some of which were very interesting At last we arrived at a point where it began to look civilized, for we passed many relics of picnic parties and knew we were in the vicinity of the chasm.

After taking care of our team, we started in search of the object of our journey, and were not long in finding it, for we suddenly found ourselves on the very brink of Purgatory itself.

At our feet lay the chasm, 60 ft. in depth, 1000 ft. in length, and 30 ft. in width. The hill through which it extends must have been forced apart by some internal convulsion, and a wedge-shaped mass dropped into it. Huge masses of rock have fallen from the sides, so that the bottom is but a barren mass of rocks; not a tree or bush can be found in the entire length.

Descending to the bottom, we made our way among the rocks and found many little caves and tunnels that were formed by the rocks when they fell. Some of the caves are natural ice-houses and ice is said to have been found in them all summer. Most of the caves are damp and cold, and the roof and sides are covered with a thick coat of moss. A small brook finds its source among the rocks, and I could plainly hear the trickling of its water as it dripped from rock to rock on its way to the larger stream.

The only minerals of importance found here are mica, feldspar, and quartz, that make up the ledge, and an occasional beryl. Near the entrance of the ravine a large tree has fallen from above, and over its entire surface are carved the initials of visitors.

Purgatory is wild and attractive, and as one gazes into its rocky depths he can easily understand why it should have received the name of "Purgatory."

Receipts.

Cement for attaching Metal to Glass.—Copal varnish, 15; drying oil, 5; turpentine, 3. Melt in a water bath and add 10 parts slacked lime.

To render Glue Waterproof.—Soak the glue in water until it is soft, then melt in linseed oil, assisted by a gentle heat. This glue is not acted on by water or damp.

Alloy for Filling Holes in Iron.—Lead, 9; antimony, 2; bismuth, 1. This alloy expands in cooling, so that when a hole is filled with the melted alloy, the plug is not loose when it is cold.

Cement for Glass, Earthenware, etc.—Dilute white of egg with its bulk of water and beat up thoroughly. Mix to the consistency of thin paste with powdered quicklime. Must be used immediately.

Arsenical Preservative Powder.—Arsenic, 4 oz.; burnt alum, 4 oz.; tanner's bark, 8 oz Mix and grind together to a very fine powder. This is dusted over moist skins and flesh, and preserves almost any animal matter from putrefaction.

To fix Pencil Marks so they will not rub out.—Take well-skimmed milk and dilute with an equal bulk of water. Wash the pencil marks, whether writing or drawing, with this liquid, using a soft camel-hair flat brush, and avoiding all rubbing. Place upon a flat board to dry.

Etching Liquid for Steel—Mix 1 oz. sulphate of copper, ¼ oz. of alum, and ½ a teaspoonful of salt reduced to powder, with 1 gill of vinegar and 20 drops of nitric acid. This liquid may be used either for eating deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act. Cover the parts you wish to protect from its influence with beeswax, tallow, or some similar substance.

THE
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THOS. CHAMBERLAIN, JR.,
284 Pavonia Ave.. Jersey City, N. J.

With this number we start a department on Archæology, under the supervision of Mr. Joseph Wigglesworth, which we hope will receive the support of those interested in this science. All articles and notes intended for it should be sent direct to Mr. Wigglesworth.

All queries to be answered in Correspondents' Column should be sent to either Mr. Thomas S. Ash, 126 Chestnut Place, West Philadelphia, Pa., or to the editor of this paper.

A rich-paying volume of gas has been struck at the Greenville Well, Sharon, Pa.

By a mistake of the Compositor in our last number, the formula for "Betrandite" was put after "Sanidine and Topaz" Subscribers will please make the correction in their copy.

We are indebted to Mr. Russell E. Bartlett for a fine star-fish sent us. See his ad. in another column.

Turquoise, pseudomorphous after Apatite, is found in several localities in California, with the original form so well preserved as to leave no doubt as to the character of the mineral after which it is pseudomorphed.

In the next number Mr. Ash's third paper, on "Double Refraction and Polarized Light," will be given.

A natural mountain of salt has been discovered near Berga, along the Mediterranean, within the province of Tripoli, on the north coast of Africa. Salt manufactured from the pure rock is claimed to be superior to that artificially produced from sea-water, while it gives a waste of scarcely 2 per cent.

We return thanks to Mr. George F. Kunz, Hoboken, N. J, for his interesting pamphlet on "Precious Stones."

Platinum wire can be drawn so fine that it is no longer visible to the "naked" eye, and can only be felt. It can be seen with a magnifying glass when the wire is held against white paper. It is used in telescopes and similar instruments.

Electricity has been brought to the aid of the sportsman by the use of a small lamp for the front sight of a rifle, to render it visible in the dusk or when from any cause whatever there is insufficient light. The minute electric lamp is fixed near the muzzle of the gun and shielded by a metallic screen. The current is supplied by a small battery in the stock.

M. Pierre Picard considers the sun-spots as aerolites which have fallen into the sun, and which preserve on its incandescent surface the spheroidal state during the entire duration of the spot.

Prof. Alexander Winchell, of the University of Michigan, offers to aid geological students.

By the aid of a recent French invention divers are now enabled to descend 800 feet below the surface of the water.

ANSWERS TO CORRESPONDENTS.

C. E., Webster, Mass.—Mr. Wigglesworth is perfectly reliable, as are all the persons found in our advertising columns.

J. C., Galveston, Texas.—Creases can be taken out of drawing-paper or engravings by laying the paper or engraving, face downward, on a sheet of smooth, unsized white paper; cover it with another sheet of the same, very slightly damped, and iron with a moderately warm flat-iron.

H. G. McC., San Francisco, Cal.—Hyalite is a variety of Opal, sometimes called Müller's Glass, after the discoverer. It is clear as glass, colorless, constituting globular concretions, and also crusts with a globular, reniform, botryoidal, or stalactitic surface; also passing into translucent and whitish.

Wm. H. N., Jacksonville, Fla.—Meteorites are divided into five classes. First, those consisting essentially of iron; second, those having an iron ground-mass with inclosed silicates; third, those consisting chiefly of olivine and bronzite, with iron as a subordinate constituent; fourth, those consisting essentially of olivine, bronzite or pyroxene, and, fifth, those consisting essentially of augite, bronzite, lime, feldspar, with a shining crust.

H. O., Dayton, Ohio.—Itacolumite is a flexible sandstone found in Georgia and North and South Carolina, a strip of which can be bent into a semicircle without breaking. The flexibility of this however is surpassed by a magnesian limestone found at the entrance of the Tyne, in England. This limestone is reported to be so flexible that thin layers, three feet or more in length, may be bent into a circle while damp, retaining that form on drying.

J. G. M., Augusta, Maine.—Holes can be bored in glass with great facility with any hard steel tool which is kept constantly wet with camphor dissolved in turpentine. A drill-bow may be used, or even the hand alone. A hole bored may be readily enlarged by a round file. The ragged edges of glass vessels may also be thus easily smoothed by a flat file. Flat window glass can readily be sawed by a watch-spring saw by aid of this solution.

C. H. W., Negaunee, Mich.—The deepest bore-hole in existence is the one made in searching for coal near the village of Schladebach, on the railway between Corbetha and Leipsic, at the instance of the Prussian Mining Department. It has been driven by hollow diamond-pointed rock drills and water flushing to a depth of 4559 feet in three and a half years, at an expenditure of $25,000. Its diameter at the bottom is 1872 inches and at the top 11 inches. The thermometer registered at the bottom 48° centigrade or 118.4° Fahrenheit.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

Classified fossils for minerals, size 2 x 2 inches. Correspondence solicited. **WM. MALCOLM**, 1316 S. 13th St., Phila., Pa.

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Indian and Mound-builders relics, minerals, ores, shells, fossils, curiosities, and anything suitable for a cabinet to exchange for the same. **W. L. McCORMICK**, Box 573, Newcastle, Ind.

Gypsum, fossils, celestine, heavy spar, buhrstone, limestone, etc., for minerals, curiosities, and Indian relics. These are all fine specimens. **CHAS. CRAWFORD**, Lock Box 79, Fort Dodge, Iowa.

Correspondence desired with advanced collectors. Minerals and curiosities to exchange for nickel ore, needle spar, rhomb spar, tin ore, dog-tooth spar, and fluor spar. **RUSSEL E. BARTLETT**, 211 W. Cedar St., Kalamazoo, Mich.

I have rare U. S. revenues for State revenues, pink revenues, or unp., and p. perf. documents. Rare match wrappers to exchange for such wrappers as I want. Correspondence solicited. Send stamp and list of wants to **W. P. YOUNG**, Box 1594, Portsmouth, N. H.

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ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

Indian Run.—Indian Field.—Indian Spring.

By JOSEPH WIGGLESWORTH.

BY giving a brief description of the above localities I will endeavor to prove to the young Archæologist the advisability of closely searching the spots in the name of which the word Indian is found.

I do not say that in all cases you will be rewarded for your labor, but you will generally be enabled to find new and good localities, which will help you in your study and the enlargement of your collection. This is so in the small runs, hills, clearings, etc., in the country, and named after the Indians on account of the relics found in such places.

Indian Run is a small stream of water emptying into Old Man's creek, near Pedricktown, N. J. As the name indicates, it was a resort of the Indians, no doubt being the site of one of their villages. Extending along the run, on both sides, is a succession of small hills, nearly all of which are under cultivation. On these elevations many relics of the stone age are found, such as axes, arrowheads, etc., and on several occasions remains of human beings, supposed to be those of the aborigines. At this place and all other places where the surface is of a like nature, "hunts" are better rewarded in the Spring, after the land has been plowed and well washed by the rains.

Indian Field is at Claymont, Delaware, near the Pennsylvania state-line, and about half a mile west of the Delaware river. At this place are found arrowheads, beads, drills, fragments of pottery and other relics of the Indians. This is the only locality in this section that has ever been successfully searched for Indian beads; many being found made of stone and burnt clay. Occasional axes may also be found.

Near Rising Sun, Maryland, are two localities known as Indian Spring. One is a short distance north of the village and the other a greater distance south of it. Indian relics are found at both of these springs, but in greater number at the latter. This spring is situated near the edge of a clearing, covering several acres. After the land has been plowed, this clearing abounds in arrowheads and fragments of pottery, and is eagerly sought after by local archæologists.

I HOPE that collectors will take an interest in this department and send articles of interest, and give descriptions of their hunts, rare specimens, etc. Credit will be given to the sender of articles.

JOSEPH WIGGLESWORTH.

Crystal Cave.

THIS natural wonder is situated within 15 miles of the city of Reading, Pa., on the B. & L. Railroad. This road is noted for its beautiful mountain scenery. As you travel north you can perceive in the distance spurs of the Blue Ridge, backed by the Blue Mountains themselves. They rise before you like a vision, bold and massive, blue in color, and impressive in majesty. After you leave the train and take the road for the Crystal Cave, you pass along many cone-like mountains. To your right flows the beautiful Saucony with its endless eddies and ripples. While thus admiring the beautiful scenery, you arrive at the cave, which is situated in the midst of these beautiful mountains. A spring situated at the foot of the Cave affords you one of the best drinks of pure fresh water in the world. The Cave has been refitted with walks and stairways, new explorations have been made, and many avenues have been opened which contain some of the finest stalactite and stalagmite formations in the world. The Crystal Cave has been visited by thousands of people. Scientists pronounce it one of the finest caves in existence.

IT is now thought that Kaolin is produced by the mechanical decomposition of mica.

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THE
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MONTHLY

[Entered at the Post Office of Jersey City, N. J., as Second Class Matter.]

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Double Refraction and Polarised Light.

By Thomas S. Ash.

PART I.

If a ray of light fall obliquely on a plate of glass or any other transparent medium, its direction is changed as it passes through the substance, and is bent or refracted according to a law known as the Law of Sines. There are certain transparent substances that possess the phenomena of splitting the refracted ray into two, one of which mostly follows the ordinary law of refraction, belonging to transparent substances, and the other a more complicated law. Such substances are said to possess the phenomena of double refraction. Calcite possesses this property in so high a degree, that all objects seen through it appear double. This is most strikingly observed in the transparent variety called Iceland Spar. If a rhomboid of Iceland Spar be placed on a piece of paper with a black dot upon it, the dot seen through the rhomboid will appear double, and one image of the dot will seem above the other, and in whatever position the rhomboid is placed, an imaginary line joining the two dots will be observed. The distances between the two images will depend on the thickness of the rhomboid, being greater as the rhomboid is thicker.

All transparent crystallized substances show the phenomena of double refraction except those belonging to the isometric system; the latter also at times are double refracting, but abnormally non-crystallized transparent substances show no double refraction. We find that a vast variety of bodies, which in their ordinary state, do not possess this property, may be made doubly refracting by means of pressure, by change of their form, by mechanical force, by suddenly heating and cooling them, and through any cause which alters the relative arrangement of their particles. Glass may be taken as an illustration of this class of substances, for although but single refracting in its ordinary state, it affords the phenomena of double refraction on being suddenly heated or cooled, or when under great pressure or distortion.

The light which passes through a double refracting substance suffers a peculiar change called Polarisation. A ray of light which has been once split by passing through a double refracting substance, will not be divided again on passing through another double refracting surface, and there is a certain angle for every substance which is not metallic and is capable of reflecting ordinary light, at which the ray of light which has suffered double refraction can not be reflected. A ray of light which has acquired these two properties is called Polarised Light. Light may be polarised not only by passing through a double refracting substance, but also by being reflected at a particular angle by a non-metallic reflector, or by being refracted at a particular angle through parallel plates of a transparent substance, which does not possess the phenomena of double refraction. Tourmaline, especially the green and brown transparent varieties, can be prepared so as to polarise light. If a crystal of Tourmaline be cut into plates parallel to any one of the faces of the hexagonal prism, or to the principal or optic axis of the crystal, ordinary light on passing through the plate of Tourmaline will be doubly refracted, but one of the two rays into which the ray is split will be completely absorbed by the Tourmaline, if theplate be thick enough, and the other will be transmitted.

[TO BE CONTINUED.]

More Valuable than Gold.

THE following is a list of metals the value of which is greater than gold, with their value per avoirdupois pound.

Vanadium.—A white metal discovered in 1830, $10,000.

Rudidium.—An alkaline metal, so-called, for exhibiting dark red lines in the spectrum analysis, $9,070.

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Lithium.—An alkaline metal, the lightest metal known, $7,000.

Glucinum.—A metal in the form of a grayish black powder, $5,400.

Terbium.—Obtained from the mineral gadolimite found in Sweden, $4,080.

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Erbium.—The metal found associated with yttrium, $3,400.

Cerium.—A metal of high specific gravity, a grayish white color, and a lamellar texture, $3,400.

Didymium.—A metal found associated with cerium, $3,200.

Ruthenium.—Of a gray color, very hard and brittle, extracted from the ores of platinum, $2,400.

Rhodium.—Of a white color and metallic luster, and extremely hard and brittle. It requires the strongest heat that can be produced by a wind furnace for its fusion, $2,300.

Barium. The metallic base of baryta, $1,800.

Calcium.—The metallic base of lime, $1,500.

Palladium.—A metal discovered in 1802 and found in very small grains, of a steel-gray color and fibrous structure, $1,400.

Osmium.—A brittle gray-colored metal, found with platinum, $1,300.

Strontium.—A malleable metal of a yellowish color, $1,200.

Iridium.—Found native as an alloy with osmium in lead gray scales, and is the heaviest of known substances, $1,090.

Receipts.

Mucilage for Wood, Porcelain, or Glass—To eight and one-half ounces of a strong solution of gum arabic add twenty grains of a solution of sulphate of alumina dissolved in two-thirds of an ounce of water.

Florida Water.—Dissolve in ½ gallon of 90 per cent. alcohol 1 ounce each of oil of lavender, oil of bergamot and oil of lemon, and of oil of cloves and cinnamon, 1 drachm each; add 1 gallon water, and filter.

To Deodorize Rubber Articles.—Cover them with charcoal dust; place them in an inclosed vessel and raise the temperature to 94° F.; let it remain thus for several hours; remove and clean the articles from the charcoal dust, and they will be found free from all odor.

Artificial Coral.—Twigs, raisin stalks and any objects having the general outline of branched coral may be made to resemble that article by being dipped in a mixture of 4 parts resin 3 parts beeswax and 2 parts vermillion, melted together and thoroughly mixed. The effect is very pretty, and for ornamental work such imitation coral is very useful.

Cement for Rubber.—Powdered shellac is softened in ten times its weight of strong water of ammonia, whereby a transparent mass is obtained, which becomes fluid after keeping some little time without the use of hot water. In three or four weeks the mixture is perfectly liquid, and, when applied, it will be found to soften the rubber. As soon as the ammonia evaporates the rubber hardens again and thus becomes impervious both to gases and to liquids. For cementing sheet rubber or rubber material in any shape to metal, glass or other smooth surfaces the cement is highly recommended.

Finding a Rich Deposit of Silver.

ONE of the greatest "strikes" of mineral in the history of Leadville is now agitating the mining world. The strike is in the Henrietta and Maid of Erin mines, on Carbonate Hill, just outside of the city limits.

The ore body was encountered at a depth of 600 feet in the Henrietta shaft which adjoins the Maid of Erin claim. For thirty-six feet the shaft has been sunk through the mineral and the bottom is not yet reached.

From the drifts made it is estimated that the ore body, which is known as a "blanket vein," covers an extent of one or two acres.

The ore is worth, on an average, $20 per ton, and the ore body uncovered is estimated to be worth from $4,000,000 to $6,000,000.

For the first twenty feet the ore is sand carbonate, bearing 45 per cent of lead and ten ounces to the foot in silver. The next ten feet the ore will run 55 per cent of lead and fifteen ounces of silver. For the last six feet the ore is of the same sandy formation, but so hard that it requires blasting to remove it.

The ore body is what is known as the second contact, and the strike has doubled the value of all the numerous mines on Carbonate Hill for the reason that it demonstrates the general belief that at a certain depth the same contact will be encountered in all the mines on the hill.

The adjoining properties are the Morning Star, the Brooklyn and the Agassiz. The owners of the Henrietta are D. H. Moffat, president of the Denver and Rio Grande Railway, ex-Senator Chaffee, General J. C. Wilson, of Denver, James G. Blaine and ex-Senator Tabor. The latter is the largest owner, holding a three-eighths interest. Mr. Blaine and Mr. Wilson each own one-sixteenth, and the other gentlemen are equal owners.

The Maid of Erin is owned by ex-Senator Tabor, Major Dubois, of Leadville, and Messrs. Moffat and Chaffee, of Denver. They each own a one-fourth interest. The Maid of Erin was in litigation for several years, but the suit was won by the present owners. The Henrietta was formerly a paying mine, but recently it has not paid expenses.

The Pike's Peak Railway.

THE Pike's Peak Railway, which is expected to be in operation this year, will be the most notable piece of track in the world. It will mount 2,000 feet higher than the Lima and Oroya Railway, in Peru.

It is now in operation to a point over 12,000 feet above the sea-level. The entire thirty miles of its length will be a succession of complicated curves and grades, with no piece of straight track longer than 300 feet.

The maximum grade will be 316 feet to the mile, and the average grade 270 feet. The line will abound in curves from 500 to 1,000 feet long, in which the radius changes every chain.

A Diamond Saw.

IN consequence of stone-boring appliances having been successfully constructed with cutting surfaces of black diamond, this material has now been adapted to a saw for stone. An Alsatian factor has commenced the manufacture of this saw, which is put in motion by a steam engine of two-horse power. The quantity and quality of the work produced are said to be very satisfactory, and the saw is considered to be applicable to all kinds of stone.

WITH one part of an alkaline sulpholeate and one or two parts of benzol, carbon disulphide, oil of turpentine, etc., A. Muller Jacobs says we obtain perfectly clear liquids of an oily constitution which, on the addition of a few drops of ammonia, dissolve in water in any proportion. With the aid of heat, sulphur, camphor, thymol, naphthol, phenol, etc., may be dissolved in the sulpholeates in considerable proportion.

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THOS. CHAMBERLAIN, JR.,
284 Pavonia Ave., Jersey City, N. J.

To Whom it May Concern.

It has been the desire of some of the subscribers of the Exchangers' Monthly, to organize an association for the promotion of mutual improvement.

The society aims to induce its members to engage in a systematic study at home, and afford its members mutual assistance by correspondence and local meetings.

Various plans have been discussed as to the expedient way of organizing such a society, and correspondence has been effected with scientific institutions, and persons engaged in scientific research, with very favorable results. It is earnestly requested of those who favor such an organization, to suggest its necessities, its mode of conducting the meetings, and the way to make it most successful.

An early reply with a full expression of your ideas is solicited.

Please address all replies to Thos. S. Ash, 126 Chestnut Place, Philadelphia, Pa.

Collectors of arrowheads cannot do better than send for one of the fine collections of Mr. Wigglesworth. See Advertisement on last page.

After thirteen years of hard work, Severn Tunnel was completed September 5, 1885. It is 22,992 feet long.

By the aid of a recent French invention divers are now enabled to descend 800 feet below the surface of the water.

Silesia yields a kind of asbestos which is made up of short interwoven fibers, and it has more than 3 per cent. of soda.

There are now on exhibition at the National Museum at Washington more than five hundred varieties of the foods used by the Indian Races.

A gigantic crystal of Spodumene, 36 feet long, and one to three feet thick, has been exposed in the Etta Tin Mine, in Pennington County, Dakota Ty.

A bullet invented by a German chemist is made of a powerful anesthetic, which breaks on striking a person, who is made unconscious for twelve hours, and while in that condition can be taken prisoner. The inventor puts forth his device in all seriousness.

A new alloy, called Argasoid, has recently been described by Mr. V. Jeuptner, of Vienna. It has been used as a substitute of silver, and its price is said to exceed that of brass by about 50 per cent. Its density is 8.44 and chemical composition as follows: Tin, 4.035, lead, 3.544; copper, 55.780; nickel, 13.406; zinc, 23.198; iron, trace.

A boiler has been made in France in which the metallic surface exposed to fire does not touch the water. The boiler, it is said, cannot become red hot, but is enveloped all over by the same temperature. The vaporization is very great, and the last drop of water can be converted into steam without any danger of explosion.

ANSWERS TO CORRESPONDENTS.

J. R. N., Nashville, Tenn.—An electrical signal travels at the rate of 16,000 miles per second.

F. R. T., Rutland, Vt.—A frozen plant may be revived if thoroughly drenched in cold water, because the application of the liquid produces a neutral thaw.

S. G. H., Oakland, Cal.—Mr. Ash's articles commenced in No. 3: back numbers can be had at 5 cts. each, or you can have your subscription commence with that number.

B. A. T., West Chester, Pa.—Where worms infest flower pots they may be driven out by mixing an ounce of ammonia in a gallon of water and sprinkling it over the earth.

J. D. V., Fort Leavenworth, Kansas.—The next number will be illustrated and an unusually large edition will be sent out, therefore will be sure to afford advertisers an excellent return for their outlay.

A. G., Galveston, Texas.—Soap trees similar to those growing in China and Japan, flourish in Florida. The fruit is about the size of a marble and is ready for use without any preparation. It is usually boiled down, however, and cast into bars.

H. D., Morris, Ill.—A cement for resisting water at steam heat can be made by mixing commercial glycerine with dry litharge into a tough dough and applying the same to the parts to be covered. This will be found to answer very satisfactorily for uniting the joints of steam pipes.

P. E. F., Lynn, Mass.—Bleaching powder can be obtained by the combination of chlorine with dry slacked lime, but is commercially obtained as a bi-product in the manufacture of soda. The first application of bleaching powder for bleaching purposes was made towards the end of the last century.

G. H. B., Providence, R. I.—To prevent silverware from tarnishing, paint it with a soft brush dipped in alcohol in which some collodion has been dissolved. The liquid dries immediately and forms a thin, transparent and absolutely invisible coating upon the silver, which completely protects it from all effects of the atmosphere. It can be removed at any time by dipping the article in hot water.

N. L., New York City, N. Y.—Spiders have perfect sight only at very short distances. Their sense of touch is consequently remarkably well developed. Their smell is so good that they can distinguish odors, and their hearing is excellent. Some of them show a remarkable instinct in building their webs—even their first—in perfect geometrical form. A reflective power is evinced by their refusal of kinds of tough insects which have been once attacked unsuccessfully.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

Rare minerals for back numbers of stamp and curiosity papers. JAMES C. JAY, La Hoyt, Henry Co., Iowa.

Minerals and curiosities for Indian relics and curiosities. Lists exchanged. COLLECTOR, 305 French St., Wilmington, Del.

52-in. Stardard Columbia $40, 54-in. American Star $60; or will exchange for 48 or 51-in. Special Star and pay the difference. GRANT BELL, Minneapolis, Minn.

Darwin's Origin of Species in two volumes complete, for a good medical work or a pair of all-clamp ice skates, size 10½. A. HUGH HIPPLE, Campdid, Lincoln Co., Ontario.

50 stamps, 50 post-marks, 25 address cards, or 25 practical receipts, for any labled mineral not less than 1½ x 1½; a V nickle without cents, or an Indian arrowhead. S. J. OWEN, North Turner Bridge, Maine.

Wanted.—V nickles without the word cents and old U. S. coins; will give in exchange, minerals, shells, birds' eggs, stamps, foreign coins, etc. Please send list stating what you want in exchange. J. B. BUCK, 33 Queen St., Worcester, Mass.

Anyone having the Autographs of Gen. Robert E. Lee, Robert Toombs, Stonewell Jackson, Albert Sidney Johnston, Judah P. Benjamins, or any other distinguished Southern men now deceased, for exchange, will please address, HARVEY CLARK, Butler, Bates Co., Mo.

1500 different post-marks neatly arranged in a box the names of which are written in a ledger, 150 mixed post-marks, 100 different tin-tags, 25 mixed tin-tags, 25 different foreign stamps for the best offer of a silver watch in good condition. CHAS. FINKBINER, 533 S. Ninth St., Terre Haute, Ind.

Two stories, Johnny Wilkins Good Fortune and Snow-bound in separate books (paper), for every 2 foreign coins except those from Canada, England, Germany, or Austria. Dates must be plain, and the coins must not be rubbed or otherwise imperfect. CHARLES E. FRICH, 1019 West Lehigh Ave., Phila., Pa.

Ford's Eureka hand or power scroll saw (it will use a saw up to two inches, almost new), a Weeden upright engine, and a pair of club ice skates (clamps), all are in good order, for a camera to take a picture not less than 3¼ x 4¼, and a complete set of photographic materials for making negatives for an amateur. A. M. BRINK, 348 West 19th St., New York City, N. Y.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

Indian Relics in Iowa.

IN Iowa there are very few mounds; only three existing, I believe, in Henry County. These are situated on a hill about 1000 feet long by 200 feet wide, and is about 150 feet above the level of a neighboring corn-field. One of them was opened, but nothing was found but bones, charcoal, and partly burned sticks. There are a great many Indian graves in this vicinity; several of which have been opened. Near Rome, Iowa, over a dozen were opened and some interesting relics were found, such as arrow and spearheads, axes, bannerstones, etc. The arrow and spearheads found in Iowa, are made of white and red flint, jasper and quartz. A farmer living southwest of La Hoyt found a large spearhead, on which was engraved a picture of a deer. It was neatly drawn, showing great skill of the workman. The farmer refuses to part with it at any price. Another farmer living near Salam has a perfect Indian pipe which he found about six years ago. Indian axes are plentiful. I have about two dozen in my collection ranging in weight from one-half to ten pounds.

Last summer I found a curious relic in the shape of a maul, grooved in center and weighing about five pound. I never heard tell of another relic like it.

There are two places on Skunk river about two and a half miles from La Hoyt where it seems as if stone implements have been made. One field is composed almost entirely of arrowhead chippings and fragments of pottery. A great number of perfect relics have been found. So many relic-hunters are visiting it that they are getting thinned out.

The first time that I visited these fields I found over a dozen perfect arrowheads, three spearheads, one hatchet, one weight, and two hematite celts.

There are five Indian graves within about a mile of my home which I intend opening in the Spring.

JAMES C. JAY.

LA HOYT, IOWA.

[The curious relic spoken of by Mr. Jay in the above article was undoubtedly a net-sinker. Although the small ones are flat, the larger ones are of the shape of a maul with a groove around it.—ED.]

DOUBLE-GROOVED stone axes have been found on and in the vicinity of Tunnel Hill, near Phœnixville, Chester County, Pa.

Diamonds.

UNTIL the South African mines were discovered, the diamond was always found in sands and gravels different from the mineral in which it was believed to be found.

In Girqualand West, however, the consolidated eruptive mud of the mines was believed by some to be the true matrix of the diamond; but opinions differed on the question, and arguments were made on both sides.

M. Chaper, a French geologist, has, however, during a scientific mission to Hindostan, succeeded in finding the diamond in its mother rock.

At Naizam, near Bellary, in the Madras Presidency, M. Chaper has found the diamond in a matrix of rose pegmatite, where it is associated with corundum.

The tract of country is almost denuded of trees, bare and rocky, and the rains, wasting the rocks, expose fresh diamonds in the soil. The rock is traversed by veins of feldspar and epidotiferous quartz. Here the diamond is always found, associated with epidotiferous rose pegmatite.

The diamond crystals observed are octahedral, but less distinct in line than the stones in South Africa, which seem to have been formed in a freer matrix. It follows from M. Chaper's discovery that diamonds may exist in all rocks arising from the destruction or erosion of pegmatites; for example, in quartzites with or without mica, clay, pudding stones, etc.

ADVERTISEMENTS.

When answering advertisements found in this paper, please do us a favor by mentioning "Saw advertisement in THE EXCHANGERS' MONTHLY."

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La Hoyt, Iowa.

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Exact locality given with each specimen. To the first fifty ordering one of the above collections I will send free 6 specimens of Indian Pottery, providing they enclose six cents extra to help pay postage.

Same size as this

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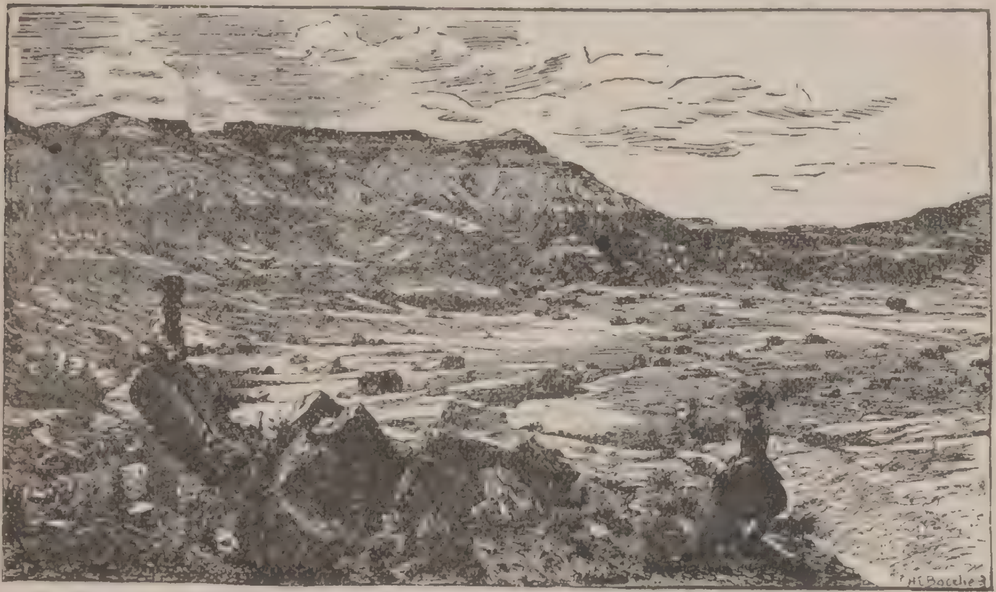

CHALCEDONY PARK, LOOKING NORTH.

Agatized and Jasperized Wood of Arizona.

By George F. Kunz.

PART I.

Undoubtedly one of the greatest of American wonders is the silicified forest in Arizona, known as Chalcedony Park—a park only in name, however, for the giant trees which once grew there have long since fallen and silicified into agate and jasper. It is situated eight miles south of Corriza, a station on the Atlantic and Pacific Railroad, in Apache County, Arizona, twenty-four miles southeast of Holbrook. This marvelous deposit of probably a million tons of silicified trees covers a thousand acres. The wood is generally found projecting from the volcanic ash and lava, which is covered with sandstone to the depth of from twenty to thirty feet, and lies exposed in the gulches and basins where the water has worn away the sandstone.

The silicification probably took place in the following manner: The trees were overthrown and covered with volcanic ashes and tufa; the heated silicified waters, either gushing from springs or forced up by the violent volcanic action which felled the trees, percolated through the ashes, cooled on reaching the tree-level, and thus produced conditions favorable to silicification.

The moisture in the tufa may have effected a partial alteration, as also any waters that may have filtrated through it from rains or springs, either hot or cold. Under these circumstances decomposition would be assisted, and much silica be set free. The waters would become charged with this, the silica being held partly in solution similar to that in liquid glass, the silicate of soda of commerce. The silicious water then slowly penetrated the wood buried in the tufa, and was slowly deposited in the cells of the wood. In this manner the fibers of the wood were replaced by the silica. The process was evidently a slow one and the trees, from all appearances, were partly decayed and water-logged when the silicification took place. The jasper and agate generally replaced the cell-walls and fibers, and the transparent quartz filled the cells and interstices, especially where the structure was broken down by decay. These cell-centers and cavities produced the conditions favorable not only for the deposition of the silica as quartz, but also for the formation of the drusy, crystalline cavities of quartz and amethyst that enhance the beauty of the material so much. It is evident from the rich variety of colors, that the waters held oxides of iron and perhaps manganese, as well as silica, the red colors being caused by hematite, the yellows and browns by limonite, and the black by oxides of manganese.

It is possible also that the ash was deposited partly in water, and thus heated it. There is every indication that the deposit is of considerable depth. Over the entire area the trees lie scattered in all conceivable positions and in fragments of all sizes, sometimes resembling a pile of cart-wheels. A tree one hundred and fifty feet in length is often found broken up into as many sections of almost uniform length, presenting the appearance of having been sawed asunder for shingle-blocks by some prehistoric forester.

[TO BE CONTINUED.]

Making Use of the Wood.

THE Jasperized Wood and Mineral Co., 246 W. 23d St., New York, will soon ship over to Germany for manufacture, about thirty tons of the finest selections of jasperized wood from Chalcedony Park, which will be cut into various articles of use and ornament, for which this beautiful stone is suitable, such as vases, dishes, center tables (of slabs of the tree-sections leaving the natural silicified bark on the outside border), mantles, tombstones, tiles (for wainscoating, paneling, and general artistic house decorating), pedestals for statues, clocks, clock-frames, and inlaid work of all kinds, handles for canes, umbrellas cutlery, paper weights, paper knives, ink wells, blotter tops, mosaic of all kinds, and an endless variety of jewelry, cabinet specimens, etc. In fact this beautiful jasper, formerly a wood which is now extinct in North America, is suitable for all such works of art, useful and ornamental articles, for which are so popular the Russian jaspers and malachite, the Pyrenees marbles, the African crocidolite, the Siberian lapis lazuli, the Chinese jades and other similar fancy, hard and precious stones. It is the intention of the J. W. & M. Co. to make a grand exhibit at the American exhibition to be held in Liverpool, commencing May 1, 1886. and early in the Spring suitable accommodations was furnished at Chalcedony Park for visitors, and a buck-board or stage run from Corroza to the first deposit, distant eight miles up a pleasant, almost level valley. At their store they have the largest accumulation of choice mineral specimens and curios in the United States.

AMONG the most enlightened Indians of America are the Zunis, Pueblos, and Navajoes, of Arizona, as well as their neighbors (the most barbarous and bloodthirsty in the world and who never have been conquered), the Chirichuas and Warm-Spring Apaches. Their photos are made by W. C. Brown, at Albuqurque, N. M., and are for sale there or at the store of the J. W. and M. Co., at 246 W. 23d St., New York City.

Double Refraction and Polarised Light.

By Thomas S. Ash.

PART II.

If we cause one plate of Tourmaline to revolve on the other, in its own plane, through an angle of 360°, we shall find that there are two positions in which it is incapable of transmitting polarised light.

There is also an instrument called Nichol's prism, consisting of two prisms of Iceland spar united together with Canadian balsam, at such an angle as to allow only one of the two rays of the double-refracted light to pass through the prism.

The Nichol's prism has this advantage over the plates of Tourmaline—that the light which is polarised by passing through them is not colored. If a ray of light, which has been polarised, pass through a double-refracting crystal, it becomes depolarised, or recovers its property of becoming reflected at all angles by a non-metallic reflector and passing through the plate of Tourmaline, or the Nichol's prism in every position in which they may be held.

This property affords a ready test for double refraction—if a plate, with parallel surfaces, be cleared or cut from any double-refracting crystal, and placed between the two plates of Tourmaline, in the position in which they lose their transparency, the transparency will be restored, and if the plate be of a certain degree of thinness, depending upon the substance of which it is composed, it will appear double.

The plate of Tourmaline, through which the light in passing is polarised, is called the Polariser, the Double-refracting Plate, the Depolariser, and the other plate of Tourmaline through which it is seen, the Analyser. Any non-metallic reflector, a plate of Tourmaline, or the Nichol's prism, may be used as the polariser or as the analyser. Any instrument arranged with any combination of any two of these for the analyser and polariser, for the purpose of observing these phenomena, is called a Polariscope. The most convenient analyser is a polished mahogany table or a sheet of glass lying on the table, reflecting the light of the sky falling on it through a window. If a thin plate of Mica or Selenite, held in the hand with its plane perpendicular to that of the table, be viewed through a plate of Tourmaline or a Nichol's prism, by advancing or retiring it from the table, its polarising angle will soon be discovered by the brilliant tints it will afford. When this angle has been determined, if we substitute for the plate of Mica a thicker slice cut from any transparent crystal belonging to the hexagonal system, perpendicular to the optic axis, or to any of the faces of the hexagonal prism, taking care to hold the slice close to the analyser as we cause the analyser to revolve around its axis, we shall see a black cross surrounded by a brilliant series of rings, exhibiting all the colors of the spectrum, succeeded by another series of rings, intersected by a transparent cross. The cleavage rhomb of calcite, or that of nitrate of soda, properly prepared and viewed through the two triangular planes, will exhibit these phenomena with great brilliancy if the thickness of the plate, or the distances through the triangular planes, be from ¼ to ⅛ of an inch. The intervals between the rings are smaller as the thickness of the slice increases, or the thickness of the slice being the same, they are as the double-refracting energy of the substance from which it is cut. In crystals of the tetragonal system, the slices must be cut parallel to the basal pinacoid of the crystal.

Quartz is an exception to other substances belonging to the hexagonal system, as it presents the phenomena of circular polarisation. The slice of quartz, cut perpendicular to the optic axis or any of the planes of the hexagonal prism, presents in every position of the analyser the rings without the cross, the center of the inner ring being of one colors which passes through all the varieties of the spectrum, as the analyser is rotated on its axis. In some specimens, the color succeed in their order from red to violet, as the analyser is moved from right to left, and in others when it is moved from left to right.

[TO BE CONTINUED.]

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Address all subscriptions and communications to

THOS. CHAMBERLAIN, JR.,
284 Pavonia Ave., Jersey City, N. J.

WITH this number we complete the first half-year of our Monthly and ask our subscribers if we have not kept our word to make each number more interesting than the preceding one. We shall continue to improve it as much in the future as in the past and ask your assistance in the way of articles, exchanges and subscriptions. We hope by the end of the first volume to have received enough subscriptions to enable us to double its size, so ask you to help us to accomplish this. Look out for the next number.

FOSSIL remains of an archæopteryx, the oldest known bird, which seems to form the connecting link between birds and reptiles, has just been sold to the Berlin Museum for $5000.

PERSONS receiving this number who are not subscribers, should send in their subscriptions in order to secure the continuation of our interesting article on Chalcedony Park, with its Agatized and Jasperized Wood. It will also contain an illustration of the Bridge of Agate.

ATTENTION is called to two races of men which must soon become extinct: The Maoris, of New Zealand, now reduced to less than 40,000 souls, and the Laplanders, who number about 30,000.

THE cut on first page was reproduced especially for this Monthly from an engraving in the "Popular Science Monthly," who kindly granted us permission to reproduce it.

DECHINITE has been discovered in Montana.

WE return thanks to Messrs. Mason & Co. for a package of the "Housekeeper's Friend" sent us, and found it could do all that was claimed for it. We recommend it to our readers. See Ad. in another column.

A NEW discovery is that, by the simple use of citric acid or citrate of silver, sea water may be made drinkable. By this means chloride of silver is precipitated, and a harmless mineral water is produced. An ounce of citrate renders a half-pint of water drinkable. If the fact is sustained by experiment and analysis, the discovery is one of the greatest value.

LOOK out for the next number of the EXCHANGERS' MONTHLY, which, besides having interesting articles by Mr. Ash and Mr. Wigglesworth, Receipts, Exchanges, etc., will contain the second part of the interesting article on Agatized and Jasperized Wood, together with an illustration of that great natural wonder, the Bridge of Agate. This alone is worth the subscription price. Send in your subscriptions.

MANUFACTURING of blue glass and glass fluxes by means of oxides of copper was known to the ancient Egyptians, and was used in glazing earthenware. The blue was of the turquoise shade.

IN a recent experiment, M. Ch. Tellier raised 2500 quarts of water in an hour from a depth of twenty feet with a power generated simply by the natural heat of the sun.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

California minerals for ores or crystallized specimens Send for list. R. P. CHANDLER, Riverside, Cal.

50 sea shells for every 25 official, 100 revenue, or 100 old U. S. stamps. WILL M. CLEMENS, Jamestown, N. Y.

Fine specimens of minerals, fossils, coins, shells, etc., for fine minerals. Lists. JOHN STURDEVANT, 27 W. Market St., Wilkes Barre, Pa.

A pair of No. 9 Imperial Club ice-skates (3 yrs. old, cost $8.50), for a Flobert rifle costing no less. C. F. McLEAN, 3120 Calumet Ave., Chicago, Ill.

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A receipt and directions for mounting birds by the new process of embalming (no skinning required). Birds mounted in time it takes to prepare a skin and with much better results, for $2.50 worth of Taxidermist's tools, birds' eggs, fossils, Indian relics or minerals. J. G. WAINWRIGHT, Waukegan, Ill.

Galena, iron pyrites, quartz, mica (black and white), gypsum, dendrite, moonstone, calcite crystals, petrified pinewood, feldspar, silver and gold ore, moss agates, asbestus, a lot of old U. S. cents, also some old N C. and Tenn. state notes, for fine minerals or curiosities. J. A. MURKIN, JR., 67 West End Avenue, Nashville, Tenn.

A Wells, Fargo & Co., franked envelope, used and entire, for a 24, 30, or 90-ct., 1869, stamp in good order. A 1-ct. U. S. periodical stamp, unused, for every 90-ct., 1861 or 1851, in good order. A set of 7 Hamburg envelopes, unused, for any 15 U. S. stamps before 1870, and excepting the 3-ct., 1861. U. S stamps wanted. A. W. DUNNING, Pottstown, Pa.

Books, postmarks, tags, minerals, a magic lantern with about 35 views throwing an eight-foot picture, with show tickets, lectures, bills, and everything complete, stamps, magazines, papers, etc., etc., to the value of $75 00, for a large printing press with outfit, or magic lantern worth $15 for a printing outfit. ILLINOIS PHILATELIST, Box 836, Rock Island, Ill.

I will give 4 postmarks for each foreign stamp or whole postal card, foreign, no duplicate to be given by either. 6 postmarks for each U. S or dept. stamp not in my collection. Send some to chose from. 20 postmarks for each 100 common U. S. stamps (1 and 2-cent envelope stamps not taken). Also will exchange foreign for U. S. stamps not in my collection. A. R. N. YOUNG, Strong, Maine.

Autographs of U. S. Grant, G. B. McClellan, P. H. Sheridan, Fitz John Porter, J. C. Fremont, Jno. Pope, James Longstreet, G. T. Beauregard, W. S Hancock, Hayes, Jeff. Davis, Nast, Astor, Gough, Cleveland, Stedman, "Bill Nye," Barnum, Blaine, Holmes, Whittier, Trowbridge, Bancroft, Edison, Schurz, Conkling, Crook, and many others, in exchange for autographs and letters of prominent persons. Have also coins, stamps, confed. cy, in exchange for autographs. WILLIAM FISHER CORNELL, Kalamazoo, Michigan.

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Stilbite, crystallized and radiated, molybdenite, basanite, beryl, hematite, heulandite, cacoxenite, chabazite, rutile, vermiculite, brucite, zincite, franklinite, hornblende, stibnite, dewelite, celestite, barite, selenite with native sulphur, chalcopyrite, cryolite, pyromorphite, cerussite, galenite, tourmaline, zaratite, datholite, apophyllite, malachite, native copper, satin spar, acadialite prehnite, fluorspar, oligoclase, moonstone, rhombspar, pectolite, dog-tooth spar, siderite, sphalerite, drusy quartz, scapolite, and many other fine cabinet specimens for the same. F. J. LEWIS, 710 N. 22d St., Philadelphia, Pa,

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

Brier Hill: an Old Battlefield.

BRIER HILL is situated about a quarter of a mile east of the village of Newport, in Newcastle County, Delaware. It is a slight elevation about twenty-five feet above the low-water level of the Christiana Creek, a broad stream which flows at its base. By the number of relics found at this place it was a favorite resort of the Indians, undoubtedly being one of their best fishing-grounds. A very large amount of fragmentary pottery has been found at this locality, all of it being found on the southeastern side of the hill. This goes to prove that they remained there all winter, as well as the summer, because they pitched their tepees on the southeastern slope of the hill to shield them from the cold "northwesters." About two hundred yards west of Brier Hill is another small hill, leaving a plateau-like valley between.

On the western slope of Brier Hill and the eastern slope of the other hill many war-points are found, a few also being found in the valley between the two hills. Now to the young collector, the location of these war-points would show nothing, but he would simply return home exultant over his finds without even giving their location a single thought. The farmer also would merely pick them up, remark that it was curious how the Indians made them, without suspecting the knowledge that they convey to others. But the location of these war-points proves much to the old Archæologist It tells him that, at one time, there was a battle fought at that locality between two tribes of the aborigines. That one tribe commanded one hill and their enemies the other. The points found in the valley are those that fell short of their mark, while the ones found upon the hill-death sides are those that dealt and destruction to the ranks of the Indians.

Receipts.

Type Metal.—Lead, 44; antimony, 8; tin, 1.

Amalgam for Electrical Machines.—Tin, 1 oz.; zinc, 1 oz.; mercury, 2 oz.

Aluminium Silver Alloy.—Copper, 70; nickel, 23; aluminum, 7. Has a beautiful color and takes a high polish.

Imitation of Ground Glass.—Paint the glass with the following varnish: Sandarac, 18 drachms, mastic 4 drachms, ether 24 oz., benzine 6 to 18 oz. The more benzine the coarser the grain of imitation glass.

Cure for Burns.—A solution of bicarbonate of soda applied to burns, promptly and permanently relieves all pain and leaves the part burned free to be used without inconvenience. Bicarbonate of soda is simply the best baking soda.

Black-Lead Crucibles.—These are made of two parts graphite and one of fire-clay, mixed with water into a paste, pressed in moulds, and well dried, but not baked hard in the kiln. This compound forms excellent small or portable furnaces.

Unshrinkable Patterns.—The best mixture for small patterns, that does not shrink in casting, is 69 parts lead, 15½ parts antimony, 15½ parts bismuth, by weight. A cheap kind for finishing patterns can be made of 10 parts zinc, 1 part antimony, 1 part tin.

Turning Glass in the Lathe.—Black diamonds are now so easily procured that they are the best tools for turning, planing or boring glass where much work is to be done. With a good diamond a skilful worker can turn a lens out of a piece of flat glass in a few seconds, so that it will be very near the right shape.

Moulds and Dies.—Copper, zinc and silver in equal proportions, melt together under a coat of powdered charcoal, and mould into the form you desire. Bring them to nearly a white heat, and lay on the thing you would take an impression of, press with sufficient force and you will get a perfect and beautiful impression.

Artificial Marble for making Paper Weights and other Fancy Articles.—Soak plaster of Paris in a solution of alum, bake it in an oven, and then grind it to a powder. In using, mix it with water, and to produce the clouds and veins, stir in any dry color you wish: this will become very hard, and is susceptible of a very high polish.

Crucibles.—The best crucibles are made from a pure fire-clay, mixed with finely-ground cement of old crucibles, and a portion of black-lead or graphite; some pounded coke may be mixed with the plumbago. The clay should be prepared in a similar way as for making pottery-ware. The vessels, after being formed, must be slowly dried, and then properly baked in a kiln.

ADVERTISEMENTS.

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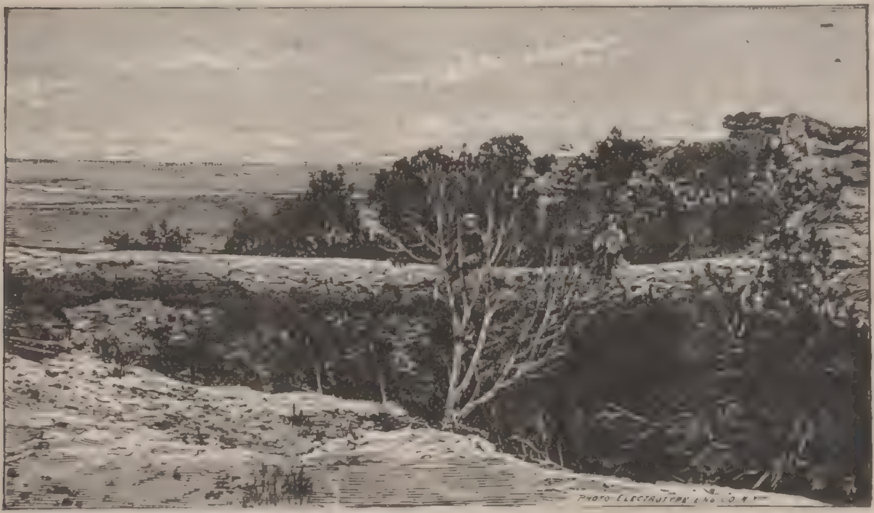
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NATURAL BRIDGE OF AGATIZED WOOD.

Agatized and Jasperized Wood of Arizona.

By George F. Kunz.

PART II.

Here we find giant trees broken into countless fragments, ranging in size from a small pebble to a fair-sized bowlder. Perfect-shaped cubes, ready to be polished and used for paper-weights, are also found. These multiplied fractures are the result of alternate heat and cold acting on the water collected in the fissures of the tree.

The highest point in the park is some two hundred feet above the surrounding level, and it is here that the buried trees can be seen to the best advantage. Some of them are one hundred and fifty feet long and ten feet in diameter, and lie exposed in all conceivable positions. One section of a tree, which has been broken up, measures eight feet in diameter, ten feet in length, and weighs several tons. The tree was originally about two hundred feet long. Some pieces of the trunks of these trees, which were brought to New York, ranged from eight inches to three feet in diameter, and from twenty-five to one thousand pounds in weight. The perfect preservation of these trunks is remarkable. The rings are so distinctly visible as to convince even the most incredulous of their organic origin.

The most interesting points in the park have been suggestively named the Agate or

Natural Bridge, Agate Gulch, Amethyst Point, Fort Jasper, etc.

The most remarkable feature of the park, and a phenomenon perhaps unparalleled, is the Natural Bridge, of agatized wood, formed by a tree spanning a canon forty-five feet in depth and fifty-five in width. In addition to the span, fully fifty feet of the tree rests on one side, making the tree visible for a length of over one hundred feet. Both ends of the tree are imbedded in the sandstone. It averages three and a half feet in diameter, four feet at the thickest part, and three at the smallest. Where the bark does not adhere, the characteristic colors of jasper and agate are to be seen.

Although silicified wood is found in many localities throughout the world, nowhere is it so beautifully colored as at this place. Here we have every imaginable shade of red, yellow, brown, and green Sometimes the colors appear in distinct spots, forming a mottled appearance; then, again, all blend so imperceptibly as to make a much more pleasing and harmonious effect than the decided banding of the agate, where the lines of demarkation between the colors are so distinct as to become obtrusive. The colors above mentioned are often relieved by white, black, and gray, and by transparent spaces of brilliant quartz-crystals, or—as sometimes occurs—of amethyst.

Broken sections of the hollow trunks are often lined with amethyst, quartz, and calcite, which add their brilliancy to the endless variety of color.

Beautiful as the wood is to the naked eye, a microscope is needed to reveal its true beauty. Not only does the glass enhance the colors, but it also renders visible the structure, which has been perfectly preserved, even to the forms of the minute cells, and is more beautiful now than before the transformation.

[TO BE CONTINUED.]

Mother-of-Pearl may be polished with finely-powdered pumice-stone which has been washed, and then finished with putty-powder and water, applied by a rubber.

Newly Discovered Minerals.

Coppelenite occurs in hexagonal crystals of a brown color, a greasy to vitreous luster on fracture surfaces. No distinct cleavage. Specific gravity 4·407. An analysis by Cleve yielded SiO_2 14·16, B_2O_3 (17·13), Z_2O_3 52·55, $La_2(Di_3)O_3$ 2·97, Ce_2O_3 1·23, ThO_2 0·79, BaO 8·15, CaO 0·61, Na_2O 0·39, K_2O 0·21, H_2O 1·81 = 100. Occurs very sparingly in small veins of augite-seyenite on the Lille Aro in the Langesundsfjord, Norway.

Pinnoite is a new borate of magnesium from Stassfurt. It occurs with boracite and picromerite. It is massive, fine-granular to compact, though with sometimes a slightly fibrous structure. The color is sulphur to straw-yellow or pistache-green. The hardness is from 3 to 4. and the specific gravity 2·27. The means of several analyses by Stromeyer yielded B_2O_3 (42·50), MgO 24·45, H_2O 32·85, Fe 0·15, Cl 0·18 for which the formula $MgB_2O_4 + 3H_2O$ is calculated.

Avalite is a new chromium mineral from the quartzite of mercury mines of Mt. Avala, near Belgrade. The original mineral was a green earthy substance, very impure, but finally for the most part separated by chemical and mechanical means from the admixed minerals. An analysis of the purest material, consisting mostly of emerald-green scales, as seen under the microscope, yielded SiO_2 56 13, Cr_2O_3 14 59, Al_2O_3 14 37, K_2O 3·54, Fe_2O_3 1·10, MgO 0 43, chromite 1·68, water (hygroscop) 2 39, ignitem 5·38 = 99·61.

Unitahite is an asphalt-like hydrocarbon from the Unitah Mts., Utah. It is obtained in masses several inches in diameter, brittle and breaking with a conchoidal fracture. Its hardness is 2 to 2·5, specific gravity 1·065 to 1·075; the color black and lustrous. It fuses easily in the flame of a candle, burning with a brilliant flame like sealing-wax and like this giving a clean sharp impression of a seal. It dissolves in heavy petroleum, also in oil of turpentine when warm, but not by ordinary alcohol nor by either when in fragments. It forms with wax a hard black mixture resembling burnt wax.

Crystallography.

By Thomas S. Ash.

Crystallography is the science which classifies the different forms of crystals, and shows the relations that exist among them. A crystal is a piece of matter that, by the action of molecular force, has assumed a definite geometrical form of some kind, with plane faces.

All crystals are assumed to possess certain axes and their form is determined by the relation which the plane surface bears to these axes. The angles of a crystal are measured by an instrument called a Goniometer. The simplest form of these instruments is the hand-goniometer, which will give only an approximate degree of accuracy, owing to the occasional imperfections of the planes of crystals, their frequent minuteness, and difficulty of applying the instrument with the requisite degree of precision. You can measure within 1 degree with the hand-goniometer, and that is, however, sufficient for the determination of the symbols of planes. The more perfect instrument and the one of highest value to crystallography is the reflecting goniometer, invented by Dr. Wollaston in 1809, which will give the inclination of planes whose area is less than 1-100000 of an inch.

Crystallography has been divided into six systems, according to Dana, viz: No. 1, Isometric, axes equal, example, cube, regular octahebron. No. 2, Tetragonal, lateral axes equal, the verticle a varying angle; example, square prism, square octahedron. No. 3, Hexagonal, three lateral axes equal, intersecting at angles of 60 degrees, the verticle axis of variable length; example, hexagonal prisms. No. 4, Orthorhombic, axes unequal, right rhombic prism, rectangular prism. No. 5, Monoclinic, axes unequal, one of the axial intersections oblique, the other two rectangular; example, oblique prisms. No. 6, Triclinic, axes unequal, three of the axial intersections oblique; example, oblique rhomboidal prism.

The so-called Diclinic system, two oblique axes, is not known to occur; for the single substance, hyposulphite of calcium ($CaS_2O_3 + 6$ Aq.), supposed to crystallize in this system, has been shown by Prof. Von Zepharwich to be triclinic (there being a slight variation from the 90 deg. angle). Moreover, von Lang and others have shown mathematically that there can be only six distinct systems.

Twin crystals are those in which one or more parts regularly arranged, are in reverse position with reference to the other parts; however, crystals which occupy parallel positions with reference to each other, i. e., those whose similar axes and planes are parallel, are not properly called twins. There are many irregularities of crystals, such as imperfections of surface, variation of angles, forms, and dimensions, internal imperfections and impurities. Pseudomorphous crystals are those where the original mineral has changed into a new compound or disappeared through some agency, and its place taken by another chemical compound to which the form does not belong. There are three classes of pseudomorphous crystals: pseudomorphous by substitution, pseudomorphous by simple deposition, incrustation, or infiltration, and pseudomorphous by alteration. This classification is according to Dana.

Crystallography, while it is of great value to the chemist and natural philosopher in their researches, it is so important a branch of mineralogy, that it is impossible to make any progress in that science without some knowledge of its principles.

Lovenite is a mineral of chestnut brown to yellowish color occurring in monoclinic prismatic crystals. Cleavage parallel to the ortho-pinacoid. Specific gravity 3·51. An analysis by Cleve yielded SiO_2 33·71, ZrO_2 31·65, Fe^2O^3 5·64, MnO 5·06, CaO 11·00, Na_2O 11 32, ign. 1 03 = 99·41, which makes it related to catapleiite, eucolite, etc. The locality is a small island, near Stoko, in the Langesundsfjord, Norway.

Picotite, a chrome spinel, has been found in the basalt of Mt. Shasta, California.

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To the Editor of Exchangers' Monthly:

Friday evening, Jan. 22d, a meeting was held, and a society organized for the systematic study of Mineralogy. The society to be known as "The Spencer F. Baird Mineralogical Society of Philadelphia.

We have received the approval and assistance of a number of prominent scientists, and cordially invite all interested in mineralogy to join with us in the study. The bylaws will be printed by June 10th. Address all communications with stamp to Thos. J. Lewis, Sec'y., 710 N. 22d St., Phila., Pa.

In our next number will appear an interesting article on the "Preparation of Minerals for Microscopic Use," the last part of Jasperized and Agatized Wood, an article by Mr. Wigglesworth, etc. Send in your subscriptions.

We are indebted to the Japerized Wood and Mineral Co., of 246 W. 23d St., New York City, for the loan of the engraving on our first page. Photos of this and other interesting points in Chalcedony Park can be obtained from them.

Recently a block of auriferous quartz, of the estimated value of $350,000, was broken out in the galleries of the Oscar Gold Mine, Bommel Island, west coast of Norway.

Titanic Remains Disentombed.—At Cartersville, Ga., the Tumlin Mound field was recently covered with water by the overflow of the river. The water has now receded and left uncovered acres of skulls and bones, many of which are of gigantic size. If the original frame was in proportion to some of the thigh bones that were found their owners must have stood fourteen feet high. Many curious ornaments of shell, brass and stone have been found. Some of the bodies were enclosed in small vaults built of stone. The whole makes a mine of great archæological interest. A representative of the Smithsonian Institution is here investigating the curious relics.

Every collector of birds' skins and eggs, should send 10 cents to John C. Cahoon, 82 Maine St., Taunton, Mass., for his 1886 Catalogue of Birds' Skins and Eggs, Natural Curiosities, and Naturalists' and Taxidermists' Supplies.

It is with extreme regret that we receive the news of the discontinuance of "Tidings from Nature," which was recognized by all as the leading amateur paper in this country. We invite its subscribers to examine our monthly.

Pulverized steatite is coming into use, quite satisfactorily, as a finish or covering for walls and ceilings. It is simply soapstone; it takes a high polish, is pearl gray in tint, presents the best possible surface for painting, either in oil or watercolor, and will neither crack nor chip. It is claimed for it that it is a non-conductor and non-absorbent; that it can be washed without injury; nails can be driven into it without damage; when subject to heat, moisture and chemical fumes it gives no smell; and it does not turn yellow with age. It is thought to be specially adapted for hospitals, factories, cellars, markets, etc.

Persons receiving this number are invited to subscribe if not already subscribers.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

To exchange rare minerals and eggs. for same. E. D. DROWN, Weldon, Mont. Co., Pa.

I will exchange 700 tobacco tags (tin), for minerals. L. J. CARTER, Waynesburg, Pa.

1 spec. of coral for every sea-shell or marine curiosity sent us. BENNETT & DEAN, 52 Portwatson St., Cortland, N. Y.

25 postmarks or 5 foreign stamps for every rare foreign stamp, please send approval sheets. C. O'MALLEY, 394 Union St., Brooklyn, N. Y.

Good stamps to exchange for minerals and stamps not in my collection. Send list to ARTHUR COSLY, 1808 Mass. Ave, Washington, D. C.

Dolomite, iron pyrites (crystals), green hornblende, garnetiferous rock, and other minerals, to exchange for minerals, fossils, etc. FRED. D. ALDRICH, Webster, Mass.

I will give 3 foreign stamps for every 6 c., 10 c., or 15c U. S. postage, not less than 5 taken at a time, or 30 foreign for every 30 c. or 90 c. FRANK CORNWELL, Rubican, Wis.

A pair of Union Hardware nickel-plated 9½-in. roller skates for the best offer of minerals, or postage stamps. JAMES K. MARSHALSEA, Point Breeze, Greenville, Hudson County, N. J

Forty-two different tin-tags, 3 small pretty shells from the West Indies, 2 rare minerals, and a large copper cent dated 1853, for different foreign stamps. No approvals wanted. W. H. WAUGH, Jamestown, Dakota.

Rare minerals for the same, or stamps, or books. Good exchange in minerals given for either the 7c or 24c. treasury, or 7 c. war department stamps, or a good stereoscope. "EXCHANGER," Box 1, Blatchford, Montana.

I wish to exchange 57 numbers of the Youths' Companion, 16 numbers of Puck, 64 foreign and American stamps, and a horseshoe crab, for a pair of clamp roller skates. M. B. R BENNETT, 1433 Lexington Ave, New York City.

Rare U. S. revenues to exch for match wrappers, Send list of what you have, or for other revenues or foreign stamps not in my collection. Will also take a few fine specimens of quartz crystals. W. P. YOUNG, Box 1594, Portsmouth, N. H.

A microscope, all brass, 7½ inches high, 2 objectives, power 40 and 100 diameters, with condensing lens, with 3 mounted objects and 1 pair of forceps in mahogany case, for offers, especially for photographing apparatus. G. R. T. 223 E. 18 St., New York City.

1 Indian bow, 1 Japanese pen, 1 pair of ice skates (Ice King No. 9), 1 pair of 8-lb. dumb-bells, lot of tin-tags, 1 lot of postmarks, 1 lot of paper-tags, and 1 good baseball, for a printing press and outfit, chase not less than 3 x 4. JOS. C. KISSELL, Box 268, Carlisle, Pa.

Correspondence desired with advance collectors having U. S. postage and revenues to exchange for others (sheets prefered), and Scott's catalogue taken as base of exchange. Correspondence with collectors in foreign countries also desired. N. E. CARTER, Delaware, Wis.

I have many books, printing press, coins, minerals, etc., for exchange. V-nickel (no cents) for 2 arrowheads I will send to any person sending me a box of minerals and curios by mail, a fine bound book worth $1.25; it will be new and good. F. A. THOMAS, Mexico, N. Y.

Rare U. S. and foreign stamps, rare minerals, Indian relics, and curiosities, for entire stamped envelopes, postal cards, match, medicine, revenue, and locals. A large quantity of periodical stamps to exch. Enclose a 2 c. stamp for postage. JAMES C. JAY, La Hoyt, Henry Co., Iowa.

A V-nickel without the word cents, for any 3 of the following stamps: 24 c. of any issue, 3 c. green centennial; 10 c., 30 c. interior; 12 c., 15 c., 27 c., 90 c. post office U. S.: Brazil, previous to 1866; any Fiji; any Peru, unpaid; Japan, 12c rose, 15 c. lilac, 45 c. carmine, 1875; any Ionian Island. L. D. WHITE, Jr., 39 E. 74th St., New York City.

Books, postmarks, tags, minerals, a magic lantern with about 35 views, throwing an eight-foot picture, with show tickets, lectures, bills, and everything complete, stamps, magazines, papers, etc., etc., to the value of $75.00, for a large printing press with outfit, or magic lantern worth $15 for a printing outfit. ILLINOIS PHILATELIST, Rock Island, Ill.

A fine specimen of copper ore from Lake Superior, a 5-cent war scrip (issued by Jersey City in 1862), a nickel without the word "cents," and a nickel with shield (issued same year), an English 2s and 5s, postage stamp, and English 1d., 3d, and 6d., and 1s. and 5s. telegraph stamps, for rare postal and department stamps. Send lists. G. B. M., 430 North Division St., Buffalo, N. Y.

Acadialite, Aquamarine, Amblygonite, Ambrite, Apophyllite, Basanite, Beryl, Bismuthinite, Bournonite, Brookite, Cassiterite, Chabazite, Chiastolite, Cookite, Damourite, Descloizite, Greenockite, Grossularite, Heulandite, Hydrocuprite, Hydrozincite, Indicolite, Iodyrite, Itacolumite, Laumonite, Lepidolite, Molybdenite, Oligoclase, Orpiment, Pyrolusite, Rubilite, Rutile, Sodalite, Tetrahedrite, Thulite, Topaz, Uranite, Vanadinite, Vermiculite, Wulfenite, Zaratite, Zircon, and Zeolites, for fine minerals only. Correspondence solicited. THOMAS S. ASH, 126 Chestnut Place, West Phila., Pa.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

A West Virginia Mound.

A MOUND was lately opened in West Virginia, which contained nearly a dozen skeletons, arranged in the following position: One of them, supposed to be the chief, lay in the center, and the rest were arranged in a circle, all with their feet toward the skeleton of the chief. A sort of rotten material was found laying upon them, supposed to be the remains of well-tanned skins. It is probable that the bodies were arranged in the position indicated, and a tent erected over them, and then dirt thrown upon it until it assumed the dimensions of a good-sized mound. In course of time, or from the weight of the earth upon it, the tent gave way, causing a deep depression in the top of the mound, often observed before its opening. The only relics found in the mound were a pair of bead bracelets, a few pieces of pottery, and a square piece of mica, found under the skeleton of the chief.

NEAR Astoria, Oregon, there is a deposit of clam shells, which covers an area of over four acres, and is piled in places to a depth of ten feet. The amount of shells is incalculable. Over a thousand loads have been hauled away to make roads, but that amount is hardly noticed in the diminution of the immense heap. From time to time relics of the old clam-eating tribes that made the place their head quarters, are found. A party recently found a clam-opener. It was made from a whale's tooth, is about eight inches long, and is ground sharp at the end. There are some sixteen inches of soil on top of these immense clam beds, on which grow fir-trees, some of them four hundred years old.

THE season for Archæological research is now at hand, and I hope that all collectors will send in descriptions of their hunts, as well as of good localities, rare specimens, etc., or in fact of anything pertaining to the subject.

Receipts.

Red Fire.—Saltpetre, 5; sulphur, 6; nitrate of strontia, 20; lampblack, 1.

Bengal Light.—Antimony, 2; sulphur, 4; mealed powder, 4; nitrate of soda, 16.

Green Fire.—Fine charcoal, 3; sulphur, 13; chlorate of potassa, 8; nitrate of baryta, 77.

Liquid Glue.—Dissolve 8 oz. glue in ½ pint of water and add slowly 2½ oz. strong nitric acid.

Carmine Ink.—Dissolve 12 grains pure carmine in 3 oz. water of ammonia and add 18 grains powdered gum arabic.

Crimson Fire.—Sulphide of antimony, 4; chlorate of potassa, 5; powdered roll brimstone, 13; dry nitrate of strontia, 40 parts.

Portable Glue.—Good glue, 1 lb.; isinglass, 4 oz. Soften in water, boil and add ½ lb. fine brown sugar. Boil till pretty thick and then pour into moulds.

Blue Ink.—Take 6 drachms pure Prussian blue and 1 drachm oxalic acid. Grind in a mortar with a little water until they form a perfectly smooth paste. Dissolve a sufficient quantity of this paste in water to give the proper tint.

ADVERTISEMENTS.

When answering advertisements found in this paper, please do us a favor by mentioning "Saw advertisement in THE EXCHANGERS' MONTHLY."

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THE EXCHANGERS' MONTHLY

[Entered at the Post Office of Jersey City, N. J., as Second Class Matter.]

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Agatized and Jasperized Wood of Arizona.

By George F. Kunz.

PART III.

Dr P H. Dudley, of New York, microscopically examined some sections of this wood, and finds that part of it at least belongs to the genus Araucaria. He says that the Araucaria excelsa, the Norfolk Island pine of the South Pacific Ocean, grows to a height of from one hundred and fifty to two hundred feet. In radical longitudinal section, the lenticular markings on the wood-cells near each end are in double rows and contiguous, the markings of one row alternating with those of the other, giving the appearance of the beautiful hexagonal markings of this genus. In central portions of the cells sometimes only one row of markings is seen, and some cells show only one row. Medullary rays were indistinct.

Other portions resembled our red cedar (Juniperus Virginianus) when grown in the extreme South. The cell structure of some indicates a growth in a mild and uniform climate, the annular rings being marked only by one, two, three, or more slightly smaller hexagonal or rounded cells, not tabular, as is usually the case. The cell-walls were nearly uniform in thickness. All the specimens examined showed that the wood originally was undergoing decay before being filled with the various media which afterward solidified. On some of the specimens [illegible], causing decay, were discovered. The beauty of the wood is largely due to the destructive influence of fungi.

Agate-cutting has been carried on as an industry for over three hundred years in the Oberstein district, in Germany, but little attention has been paid heretofore to the cutting of large masses, because few agates are found over a foot in diameter, and the banding is not such as to offer much inducement. But in the future this material will doubtless be in great demand for interior house decoration, where it can be advantageously used as inlays in wood or stone; for paneling and wainscoting walls; for tiling; and, if desired, for entire floors. Whole table-tops could be made of the largest size from a single section of one of these giant trees, and the design would be nature's own incomparable handiwork. For mosaic work it would also find a ready use, since the infinite diversity of color would afford an ample field for the imagination of the skillful artisans employed at this industry.

The rich, warm, blending colors, and the remarkable polish that this material is susceptible of, are the main features that will always give it a high place among minerals of its class. In fact, it is a question whether any of the ornamental stones, such as jade, jasper, agate, or even the marbles, have the two desirable qualities to such a degree.

As before stated, the deposit has been estimated at a million tons, but probably not more than a thousand tons would be suitable for the purpose of art, while for finer work only a small part of this would be available. One instance should be noted to show the high estimation in which this wood is held by foreigners. A Russian dealer recently paid five hundred dollars for a piece twenty-eight inches in diameter and thirty inches in length, to be cut into table-tops. A large lot was recently sent abroad for cutting, and we shall soon have a new decorative stone which will possess what very few in use now do—the proper hardness.

A piece of this material was selected by Mr. Joseph Pulitzer to form the base for the beautiful silver center piece which is being made by Messrs Tiffany & Co, to be given as a testimonial to the eminent sculptor, F. A. Bartholdi. This base is a low truncated pyramid, eleven inches square at the base, nine inches at the top, and seven and a half inches high, and is made of a single section of a tree. It was chosen on account of its superior hardness and the warmth and pleasing combination of its colors. Besides, as the designer remarked, it is eminently fitting that the testimonial should rest "on a solid American base."

This is the largest piece of such hard material that has ever been cut into a definite shape in the United States.

One of the recent freaks of fashion has been the revival of the old Scotch jewelry. The leading objection to this is the stiffness of the designs. These have in many instances, however, been Americanized and improved upon; the tame, uninteresting bloodstones and agates giving place to our own richer and brighter stones and silicified woods

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LAYERS of stone containing some of the supposed human footprints lately found near Lake Managva, in Nicarague, have been sent to the Vienna Natural History Museum. The stone is a volcanic Tufa, and the impressions are sharp and distinct, and, if genuine footprints, prove the existence of man in Central America at a very remote period.

Receipts.

Mucilage.—Mix dextrine with water and add a drop or two of glycerine.

Fusible Alloy.—Bismuth, 8; lead, 5; tin, 3. Melts with the heat of boiling water.

Secret Ink.—Write with thin solution of starch and let the correspondent wash with solution of iodine.

Shellac Varnish.—Dissolve good shellac or seed lac in alcohol, making the varnish of any consistency desired.

Freezing Mixture—Phosphate of soda, 9 parts; nitrate of ammonia, 6 parts; diluted nitric acid (acid 1 part, water 2 parts), 4 parts.

Water-proof Canvas—9½ gallons linseed oil, 1 lb. litharge, 1 lb. umber, boiled together for 24 hours. May be colored with any paint. Lay on with a brush.

Runge's Black Ink.—Digest ¼ lb. logwood in chips for 12 hours in 3 pints boiling water. Simmer down gently to one quart, filter and add 20 grains yellow chromate of potassa.

Sorel's Cement.—Mix commercial zinc white with ½ its bulk of fine sand, adding a solution of chloride of zinc of 1.23 specific gravity, and rub the whole thoroughly together in a mortar. The mixture must be applied at once, as it hardens very quickly.

Map Varnish.—Clear Canada balsam, 4 oz.; turpentine, 8 oz. Warm gently and shake until dissolved. Maps, drawings, etc., which are to be varnished with this solution, should be first brushed over with a solution of isinglass and allowed to dry thoroughly.

Antique Bronze.—Dissolve 1 oz. sal-ammoniac, 3 oz. cream tartar, and 6 oz. common salt in 1 pint of hot water; add 2 oz. nitrate of copper dissolved in ½ pint of water; mix well and, by means of a brush, apply it repeatedly to the article, which should be placed in a damp situation.

Marking Ink for Linen.—Dissolve ¼ oz. nitrate of silver in 1 oz. water and add strong liquid ammonia until the precipitate which is at first formed is redissolved. Add 1½ drachm gum mucilage and enough coloring matter to render the writing clearly visible The writing is made black by passing a hot iron over it. Keep in the dark.

Etching on Glass.—Lines and figures on tubes, jars, etc., may be deeply etched by smearing the surface of the glass with beeswax, drawing the lines with a steel point and exposing the glass to the fumes of hydrofluoric acid. This acid is obtained by putting powdered fluor spar into a tray made of sheet lead and pouring sulphuric acid on it, after which the tray is slightly warmed.

Preparing Minerals for Microscopic Use.

By Charles S. Mason.

Being interested in the results of microscopic investigations of minerals, and thinking that some of the readers of the "Monthly" would like to examine this subject for themselves, I will explain the process which I am using.

After chipping off a small slice of rock, I grind the chip off on one side on a revolving cast iron "lap" with coarse emery first; and second, with a finer grade; and lastly, with a flour of emery; each time changing the lap, or giving it a good washing, so as to get rid of all grit—as any grit getting in with a finer quality of emery, may cause a scratch which will spoil a good specimen. Frequent examinations of the surface should be made, so that all scratches may be obliterated.

After getting the one side polished, fix it to a small piece of glass (an inch square) with "Canada Balsam." (This should be gently heated and the mineral pressed close to the face of the glass, care being taken that no air bubbles are beneath it, as that would cause the specimen to break when it is ground very thin.) After fixing the slip to the glass, grind it down on the other side till it is so thin that you can almost read through it.

After the mineral is ground very thin, and well polished on both sides, place the slip with the mineral on it in a turpentine bath, which dissolves the balsam and frees the ground slip; then place the specimen on a thin slip of glass (3 or 4 inches long by 1 inch wide) with refined and very clear Canada balsam, and place over it a thin watch-crystal (size ¾ inch in diameter and 1-200 of an inch thick). Clean all superfluous balsam off and the specimen is now ready for examination under the microscope. If many slips are to be prepared, it is best to number them by scratching the number on the glass with very hard steel, quartz, diamond, or anything which will scratch glass.

This seems like a good deal of trouble, but one is well repaid for the pains it takes by the beautiful things which are seen in the formation, contents, and arrangements of the specimen.

Stalactites show their mode of formation in concentric rings; granite, gneiss, and like rocks show the tourmaline in their composition very nicely; sandstones, corals, and fossils show various forms of composition, some being in small grains, others in straight lines and in curves. Specimens prepared in this way show beautiful colors in polarized light.

The Constant Formation of Minerals.

Some curious facts relating to the incessant formation of minerals in various rocks by means of molecular transport and displacement were recently contributed to the Bulletin of the French Geological Society by M. Virlet d'Aoust. A small bell of the Gallo-Roman epoch, found in an alluvial deposit at Condesur-Iton, had been converted into a geode by deposited material, and beneath a vine at Perigneux two hundred pieces of silver coin of the fifteenth and sixteenth centuries were found surrounded by hematite, so as to form a geode. M. d'Aoust states that he has proved that all flint geodes, buhr-stones, etc., are the result of molecular movements that have taken place since the formation of the strata in which they occur, and that limonites and the iron ores of alluvial beds have the same origin and are still in course of formation. The quarrymen of France are well acquainted with the fact that flint forms again in the spots whence buhr-stones have been taken, and know also that grains of iron ore are thus formed in alluvial clays.

An asbestus mine is situated on the spur of a hill about two miles from Gundagai, New South Wales, in which the lode has been driven upon for a distance of 90 feet, and a shaft 90 feet has been also sunk. The mineral occurs in a serpentine formation similar to quartz veins and is mined in the same manner. The asbestus is said to be abundant and of very good quality.

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284 Pavonia Ave., Jersey City, N. J.

NEXT number will contain an interesting article on "Collecting with an Object in View," an article on the "Minerals of Bolton Quarry," a sketch by Mr. Wigglesworth, etc. We would here return thanks to our many friends for their interesting articles, which have done much to make the EXCHANGERS' MONTHLY a success.

THE yield of amber in the Smaland Peninsula, East Prussia, is valued at about $125,000 annually, and is steadily increasing.

SPECIMENS of iron brought from Greenland and hitherto assigned to meteoric origin are new found to be a part of the products of the country.

THE presence of zinc in plants has been repeatedly observed, not only in such as grow near deposits of zinc ore, but also, though in minute quantities, in plants which grow on soil in which not a trace of zinc can be detected.

IT appears that there are now inhabited cave-dwellings in Saxony. They are dug in a sandstone hill, have different rooms, dark and light, as well as chimneys, windows and doors, and are said to be very dry and habitable.

SILVER has been discovered and mines partially worked in twenty-one counties of Texas.

A FOREIGN device for cutting stone consists of a cord of three steel wires rather loosely twisted together, running around pulleys like a band-saw. The swift succession of blows from the ridges of the cord delivered along a narrow line disintegrates the stone rapidly.

A REMARKABLE locality of the sapphire and the ruby has been discovered in the Himalaya Mountains, at Sungchang, in Zanskar. Certain analogies in the mode of occurrence and some other particulars are traced between the crystals found in India and those produced at several American localities.

THE discovery of a hitherto unknown lake in the Persian Desert was announced at a late meeting of the Vienna Geographical Society. It is at least twenty-five miles long, and from Mohammedan evidence appears to have dried up after a previous existence and to have again filled up at a quite recent date.

IN the Province of Adana, Asia Minor, not far from Tarsus, at a few hours travel from the sea, among the mountains, has recently been discovered a ruined town hitherto entirely unknown. The ruins lie near the route from Selef-Ke to Karaman by Mohara. Sarcophagi almost intact, and resembling those of Lycia, exist there, and would seem worthy of study.

WE would call the attention of advertisers to our rates, which are cheaper than any other amateur paper. These rates, however, will only last four months longer, as commencing with the second volume we shall double our advertising rates. Until then we will receive cash orders for any length of time at the old rates. The subscription rates will not be increased for another year.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

Stuffed birds for perfect Indian arrowheads. **COLLECTOR**, 305 French St., Wilmington, Del.

Minerals, woods, etc., for fine minerals, 2x3 in. **S. BIERACH, Jr**, 213 Grand Ave, Brooklyn, N. Y.

Coins for the same. Send complete lists. Papers send sample. **C. T. TATMAN**, 93 Piedmont St., Worcester, Mass.

Twenty-five tobacco tags from Keene, N. H., for 25 from any other place. Also postmarks and stamps for same. Send list. **JOHN A. DENISON**, Keene, N. H.

A large collection of Indian relics and some curiosities for the best offer of a bicycle or any thing suitable for a boy of 16. **JOHN J. DUFFIE**, Princeton, Ark.

100 foreign stamps for every 25 revenue stamps, or for every 100 obsolete U. S. stamps, or for every unused special delivery stamp **OLIVER A. JONES**, Hoosick Falls, N. Y.

All kinds of revenue stamps to exchange for others not in my collection. Also coins, minerals, curiosities, etc. Consignments solicited. **W. A. ACKERMAN**, Marengo, Iowa.

Ten foreign stamps for every stamp or coin paper; 25 for every labeled mineral, fossil, or curiosity, or for every special delivery stamp. **A. MELVIN JONES**, Hoosick Falls, N. Y.

3 revenue stamps for every relic, a box of red clay for every old U. S. half-cent, a spec. of petrified wood for three sea shells, no correspondence necessary. **ELLIS D. ROBB**, Eldora, Ia.

For Exchange.—One little model self-inker printing press and complete outfit of several fonts of type, etc., etc, cost $20 00, will exch. it for a good silver watch, which must be worth at least $15.00. **S. P. SEAWELL, P. M.**, Bensalem, Moore Co., N. C.

I will give 4 different fossil shells for every foreign coin, foreign newspaper, special delivery stamp, arrowhead, or 50 foreign stamps, all different. I also have curiosities, stamps, etc, to exchange. Send stamp for answer. **L. E. HUDSON**, Ellisburgh, N. Y.

Mounted sea mosses, sea urchins, star fishes, skates' eggs, and other sea curiosities, fossils, skins, coins, bills, and a large number of natural curiosities for minerals. A botany or natural history, or any of the above curiosities or minerals, for a geode or green or flue crystal of tourmaline. **J. E. UNDERHILL**, 144 South Elliott Place, Brooklyn, N. Y.

I have fine specimens of zinc blende, calamine, iron pyrites, greenockite, sulphur, calcite, quartz, kaolin, limonite, limonite geodes, and red granite, for exchanges of good minerals. **C. S. MASON**, Easton, Pa.

A collection of rare U. S. and foreign stamps and two good books for a self-inking printing press, with or without type, in good condition. **HENRY SANFORD**, 3261 Cottage Grove Ave., Chicago, Ill

I will exchange 1 oz. of Mexican ore for every 250 mixed used U. S. stamps, 2 oz. for every 500 mixed used, and 1 oz. for every 20 special delivery stamps. **MARION ANDERSON**, 771 Magazine St., New Orleans, La.

Florida shells, sea urchins, skates' eggs, sea beans, sea moss, guinea peas, carnelians, Indian pottery, blue vitriol, and all kinds of sea curiosities for minerals, Indian or Moundbuilders' relics, curios, fossils, etc. **G. M. NEWHALL & CO.**, 170 Essex St., Lynn, Mass.

100 mixed postmarks for 40 mixed foreign stamps. 100 varieties postmarks for 50 varieties foreign stamps. 15 foreign stamps for every birds' egg received by me in good condition. Also fossils, minerals, eggs and curiosities, to trade for eggs, fossils, or minerals. **F. R. STEARNS**, Elkader, Iowa.

I will give instruction in Silk Culture, with samples of silk of my own raising, if any one will send me flower or vegetable seeds, plants or bulbs of any kind. Prefer roses, geraniums, or lilies at present. Anything accepted in the line of flowers. Address **LUCY H. COOMBS**, Arcadia, Valley Co., Neb

Will exchange books, minerals, coins, tags, postmarks, papers, stamps, etc., for types, fossils, Indian relics, and stamps of any kind. I will give 100 postmarks for every 10 revenue or official stamps. 50 postmarks for 50 U. S. envelope stamps. Correspondence wanted. **F. N. MASSOTH, Jr.**, Hanover Center, Lake Co., Ind.

2 volumes "Youth's Companion," 1 pair No. 4 roller skates, 1 pair 10 inch all club ice skates, 2 very good books and some rare minerals (lot valued at $7.00), for a Waterbury watch in good running order, or a pair of all clamp 11 inch ice skates, or a polyopticon of good power. **HERBERT SMITH**, Box 295, Monongahela City, Penn.

Bracket saw outfit, cards, stamps, old cents, magic lantern (with views), shells, minerals, stamp papers, etc., for coins or currency. No stamps wanted. Send lists and state what you want. Stamp papers and 10 cts. worth of stamps for every old style 5 cent, 1883, or V-nickle without cents. **W. F. BARDEN**, North Attleboro, Mass.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

Delaware.

ALTHOUGH small in size, Delaware affords a wide and interesting scope for archæological research. From the number of well-known localities and the number of relics found, it was undoubtedly at one time densely populated by the Indians. Near Claymont, in the northern part of the State, is a small clearing known by the local name of Indian Field. At this place a great many small specimens are found, such as beads, arrowheads, fragments of pottery, and also an occasional axe. The next locality going south, and perhaps the best known in this vicinity, is Edgemoor. Although many fine specimens have been taken here, I have generally given it a wide berth because of its prominence, being content with collecting on Indian sites that have been less searched. Brier Hill, on Christiana creek, and Polecat Hill, on White Clay creek, are two good localities, being distant, respectively, two and a half and seven miles from the city of Wilmington. At both of these places a very large amount of fragmentary pottery is found. Next in order we have the "Island," a slight elevation surrounded by low marshes, and about midway between Wilmington and Newcastle. A man digging a spring-ditch across this place a few years ago, found about a bushel of spearheads, some of which are in my collection. They are rather large in shape but very rude in workmanship. A number of axes from this locality grace the collections of a few local archæologists. Celts also have been found but are very rare. In the southern part of the State are the remains of the "Moundbuilders" of Delaware. From the town of Lewes to the southern state-line there is a succession of large and small mounds composed entirely of oyster-shells. In the summer months these mounds are covered with visitors industriously scratching for relics. All they find is a few arrow and spearheads which they only obtain with constant and laborious work. The above are only a few of the best known localities in Delaware. Nearly all the small creeks in the State were inhabited by the aborigines, and here the archæologist will, with a little patience, be rewarded with finding some very interesting specimens.

IT appears from surveys made last summer, that the northern limits of the Moundbuilders lie beyond the Red River of the North. Along this river and Lake Winnepeg mounds were found identical with those of the Ohio and Mississippi valleys.

MR. WIGGLESWORTH has in his collection a fine stone axe which was found four feet below the surface in an old sand-pit near Wilmington.

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When answering advertisements found in this paper, please do us a favor by mentioning "Saw advertisement in THE EXCHANGERS' MONTHLY."

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Devoted to the Mineral Resources of the South. Every collector of minerals, etc., should be a subscriber, as it will practically educate him in a most profitable science. Published monthly at 50 cts. per year. Single copies 5 cts. Address,

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SEND stamp for sample copy of **The Illinois Philatelist.** A 12-page and cover monthly, devoted ENTIRELY to the interests of stamp and coin collectors. We will give the **Davenport Alert,** and our paper for one year, for only 35 cts., regular price 50 cts. Take advantage of this offer now.

In order to INTRODUCE this paper, we will give the person answering this "ad." first, our paper and The Davenport Alert for 25 cts. THE ILLINOIS PHILATELIST, Box 836, Rock Island, Ill.

STAMPS!

Send reference and receive by return mail an approval sheet. Price list of mineral specimens sent free. Address LANDERO & CO., ENGINEERS, P. O. Box 34, Guadalajara, Mexico.

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A specimen of petrified leaves, prepaid, for 5 c. in stamps. ELLIS D. ROBB, Eldora, Iowa.

WE WILL send any of the following minerals 1x1 3c. each; 2x2, 10 c. each post-paid. Agates, calcite 3 var., chalcedony 4 var., conglomerate, honeycomb coral 3 var., jasper 3 var., limestone, limonite, pink and green feldspar, quartz white, milky, smoky, drusy, crystallized, and irised, soapstone, and hematite, all Iowa minerals (no lists).

J. C. JAY & CO.,
La Hoyt, Iowa

BOY WANTED in every town. Big pay. Send stamp. Will M. Clemens, Jamestown, N.Y.

MEXICAN MINERALS.

Price list sent free on application, and also a 5 c. sample specimen, if requested. Address

LANDERO & CO., ENGINEERS,
P. O. Box 34, **Guadalajara, Mexico.**

Unused stamps from any country received in payment.

I will send a hand-made genuine goose-quill pen for each specimen of petrified wood, or relic of any notable calamity. B. F. PHILLIPS, North Jackson, Ohio.

BARGAINS.

$210. Confederate Money, genuine and in good condition, including premium lists of old coins, besides price lists of all paper money, curiosities, etc. All for **25 cts.**

MERCER'S CURIOSITY STORE,
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W. H. BEAN, Naturalist, Lebanon, O.

The BOSS PACKET contains 500 extra fine mixed foreign stamps, including stamps from Asia, Africa, North and South America, Europe, Australia, also various islands, sent post-paid for 30 cts. Send stamp for a sheet of stamps on approval at 25 per cent. commission.

Excelsior Stamp Co.,
Hoosick Falls, N. Y.

For every Unconstitutional Nickle, or 5 large Copper Cents mailed to me, I will send a specimen of Diamonized Mica, and our old fashioned Quill Pen. B. F. PHILLIPS, North Jackson, Ohio.

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IN EVERY TOWN IN THE COUNTRY TO SELL

MASON & CO.'S
FROZEN PERFUME
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HOUSEKEEPERS' FRIEND.

Now boys, here is something you can sell in every house in the country, and in a short time make for yourself lots of pocket-money. If you work but one hour a day you could sell at least a dozen, on which we allow you 100 per cent.

The **FROZEN PERFUME** is a delicate perfume in a solid form which can be carried in the pocket or rubbed on the handkerchief. It will last longer than a large bottle of Lubin's perfume. Price 10 cts. a cake, 60 cts a dozen.

The **HOUSEKEEPERS' FRIEND** is one of the best polishing powders in the land for gold, silver, copper, etc. Every housekeeper will want another box, who has tried it. Put up in large wooden boxes, 15 cts. apiece, 90 cts a dozen. Sample packages 5 cts., to introduce it.

Now boys, do not let this opportunity slip and then growl all summer because you have no pocket-money. To those wishing to take an agency we will send an outfit for $1, consisting of one-half dozen FROZEN PERFUME, one-half dozen HOUSEKEEPERS' FRIEND, and one dozen Sample Packages, packed in a neat box, post-paid.

MASON & CO., 82 Beekman St., New York City.

FINE MINERAL NOVELTIES,
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PRECIOUS MINERALS AND GEMS OF THE ROCKY MOUNTAINS.

I have added a large number of the following goods to my stock and offer them at LOW PRICES. Each article has from 25 to 75 specimens on it and twenty different varieties. A list accompanies each, giving the names of the minerals the article is composed of.

MINERAL INKSTANDS.
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$.50 and $.75.

NUGGET SCARF-PIN, 25 cents.

COLLECTIONS OF MINERALS FROM $1 TO $100.
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Estimates cheerfully given for all size and style of collections. Special rates to Colleges, Agassiz Chapters, and all Societies. Send 2-cent stamp for Price List. Address all communications to

ARTHUR CHAMBERLAIN,
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THE EXCHANGERS' MONTHLY

[Entered at the Post Office of Jersey City, N. J., as Second Class Matter.]

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Collecting with an Object in View.

WHOEVER knew a boy who has never collected stamps, postmarks, coins, minerals, or other curiosities. These crazes for collecting will never do any good. What is needed and what is highly essential in scientific collecting is entering into it in the right spirit with an object in view. Many of the so-called Philatelists of our day—pardon the comparison—are like a child with a new toy. At first he is immensely enthusiastic, but in a short time observe the change. The stamps so expensive and rare are either thrown in some old corner and forgotten, or sold for a nominal sum.

This same thing may be seen in all branches of collecting. A true mineralogist does not merely want showy amethysts and quartz specimens, but his object should be to derive the most possible knowledge from his collection by including in his collections typical specimens of minerals which are not merely showy and not overlook the common rocks in his efforts to obtain gold and silver ores.

A true collector, if he be really interested, will never tire. Some men spend the greater part of their lives in studying the composition of new minerals and collecting old stamps and coins.

Great difference may be seen by a close observer between the collection of one who has a craze and that of a true scientific collector.

The stamps of the "Philatelist" who has the craze for collecting stamps, are generally found pasted in a book, without the least regard to country, issue, value—in a few words, without the least arrangement. In comparison, examine the neatly kept album of the true Philatelist. His stamps are neatly arranged in his album, and fastened by hinges or other neat devices in the space set apart for each in regard to nation, date, or order of issue, value, etc. This great difference may also be seen in the cabinets of mineralogists and students of palæontology.

The specimens of the true mineralogist are neatly labeled by printed slips giving scientific and common names, locality, date, and often the composition of each. The specimens of the person who wants to keep something are very often unlabeled and if labeled, very carelessly or inaccurately, are not arranged according to any system, but are put in just as he receives them.

A good mineralogist, for instance, will label a specimen: Itacolumite (Flexible Sandstone), North Carolina. He will also carefully make room for it among his quartz specimens. The aimless collector will label his specimen, if he label it at all, perhaps something like "Bending Stone." He is also just as likely to put it next to a gold or silver specimen as he is to put it anywhere else.

So, brother collectors, do not get a craze. Take one branch of science, no matter if it be Geology, Mineralogy, Philately, or Numismatics, study it well, collect specimens to illustrate the chosen science, and study them well, then no one can justly accuse you of having a craze.

MINERALOGIST.

Composition on Iron Ores.

By A NEW ENGLAND BOY.

THIS morning the teacher passed each boy three specimens. One of the boys brought his specimens to the desk and the teacher tried them with a magnet. One of them was reddish, the other was yellowish, and the other was black. The yellowish one and the reddish one we found was not magnetic, but the black one was magnetic. These specimens were all iron ore, from which iron is obtained. From the black ore we found that the best iron was obtained.

We were then told to rub each specimen on a piece of paper. The red specimen made a red mark, and the yellow specimen made a yellow mark. From the other specimen, which was black, the most of us could not make it mark on account of its hardness; but our teacher told us if there were some powder on it, we could make it mark a black streak.

Then the teacher took some small pieces of the yellow ore and put them in a test tube, and held the tube over the flame of an alcohol lamp, and each line filed around to see what it formed in the tube, which was water. There was no water in the tube when the ore was put in, therefore it must have come from the ore. This ore is called limonite or bog iron ore, because it has so much water in it, and is found in wet, marshy places. The name of limonite came from a word meaning meadow.

The teacher then took them out of the test tube, and tried them with a magnet, and found they were not magnetic. It was proved that they were not pure iron, because they would not stick to the magnet.

We found that these pieces of iron ore contained iron and oxygen, therefore they were iron oxides. When these pieces were rubbed on paper, they made a streak like the red ore. The name of this red ore is hematite, which means blood red. Hematite is composed of iron, oxygen, and no water; and once it was supposed to be limonite, and the water driven out of it by the heat of the earth.

Teacher then took the pieces of limonite which was heated in the test tube, and put them in a piece of charcoal, which is a form of carbon, and blew the flame of an alcohol lamp on the charcoal by a blow-pipe. After she got most of the oxygen out of the pieces, she then took them on a piece of paper, and tested them with a magnet, and found the smallest pieces were magnetic, because they were heated the most. The black ore is magnetic, which contains the best iron.

Receipts.

Cold in the Head.—Powdered borax snuffed up the nostrils is a good remedy for cold in the head.

Black Walnut Stain.—Take Brunswick black, thin it down with turpentine until it is about the right tone and color, and then add about one-twentieth its bulk of varnish. This mixture, it is said, will dry hard and take varnish well.

Extinguishing Incipient Fires.—Crude calcium chloride twenty parts, salt five parts, dissolved in seventy-five parts of water. To be kept at hand and applied with a hand pump.

Hair Tonic.—Quinine sulphate, 20 grains; glycerine, 1 fluid ounce; cologne, 2 fluid ounces; bay rum 2 fluid ounces; rose water, 11 fluid ounces. Rub the quinine with the glycerine, and add the other ingredients in order named. The addition of fluid extract of jaborandi is recommended to stimulate the growth.

Memedy for Burns.—Mix 4 ounces of the yolk of eggs with 5 ounces of pure glycerine. This forms a kind of varnish.

Olmstead's Varnish.—Melt two ounces rosin in one pound fresh sweet lard. Melt the rosin first and then add the lard and mix thoroughly. This is applied to the metal, which should be warm, if possible, and perfectly cleaned; it is afterward rubbed off. This has been well proved and tested for many years, and is particularly well suited for planished and Russia iron surfaces, which a slight rust is apt to injure very seriously.

Porcelain Cement.—Add plaster of Paris to a strong solution of alum till the mixture is of the consistency of cream. It sets readily, and unites glass, metal, porcelain, etc., quite firmly

Minerals of Bolton Quarry.

By John J. Alton.

The Bolton Quarry is one of Massachusetts most noted mineral localities, and there are probably very few mineralogists or collectors who have not a specimen of the famous lilac Scapolite from this locality in their cabinets. Here also is found the rare Nuttalite, generally massive, but sometimes in fine crystals, which are quite perfect and translucent. Crystals of this mineral, as well as all the others from this locality, are quite rare, for the reason that they are so much sought after. If a collector expects to get good crystallized specimens from here, he will have to do considerable digging. Fine crystals have been found in the past and of course there are still others there to reward some enterprising collector of the future.

There is plenty of massive Scapolite and Nuttalite, also Calcite and Boltonite; but one will have to depend altogether on luck for the other minerals found here. Large boulders of Scapolite lie scattered about, in color from white to pink and lilac; one especially fine colored mass lies exposed near the top of the ledge.

The Nuttalite is sometimes found in imperfect crystals of a brown color scattered through the white limestone, and makes quite a showy specimen.

Apatite is found massive and in small crystals of a bluish green color, which are found scattered through the white limestone. This also makes a very pretty cabinet specimen.

Sphene in small brown crystals, some of which are quite perfect, is found here, generally associated with Pyroxene and Petalite.

Yttrocerite of a fine purple color is found here, but is quite rare. When first found it is of a pale color, but gradually changes on exposure to a deep purple.

Pyroxene crystals, Diopside and Petalite, can be obtained in good specimens.

The quarry was at one time worked for lime and a good quality was obtained, but for some reason was abandoned; not, however, until a large quantity of rock had been removed. The principal minerals were found just above the strata of limestone, and of course all of this material had to be removed to get at the Calcite below.

Nearly half an acre of ground, to a depth of six feet, is covered with the debris taken from the quarry. The surface of this is now overgrown with grass, but the edges are still open. For years all the minerals which has been obtained have been taken from this outside edge. For this reason good specimens are difficult to obtain unless one is supplied with suitable implements.

Louisiana Iron.

The exhibits at the Exposition have unearthed and made public a discovery which will have an important effect on the future of North Louisiana. This is the discovery of rich and valuable iron deposits in various portions of North Louisiana, ores of wonderful purity and freedom from other metals, valuable in the percentage of iron they contain, in their nearness to coal deposits, so that they can be cheaply worked, and in a favorable situation for the transportation of the iron to the market. The exact amount of iron and the location of all the ore are as yet not fully known. We know, however, that there are large bodies of it in Claiborne, Bienville, Bossier, Webster, De Soto and Sabine parishes; and presumedly in other portions of North Louisiana. The fields in Claiborne, Bossier, Webster and Bienville have been examined by skilled mineralogists for the purpose of finding whether they were sufficiently rich to warrant working them, and the answer, after a thorough investigation, has been most favorable. The ore, which is nearly pure hematite. has been brought to New Orleans, thoroughly analyzed and worked and converted into iron. It is declared to contain as large a percentage of metallic iron as Alabama ore. The deposits generally lie close to the Vicksburg, Shreveport and Pacific Railroad, and consequently the product is easily transportable to market.

THE
EXCHANGERS' MONTHLY.

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THOS. CHAMBERLAIN, JR.

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NEXT number will contain an interesting article on the treatment of Dakota tin ore and its associated minerals, and a description of the zinc mines at Friedensville, Pa., and its engine, which is said to be the largest fixed single engine in the world. Besides these there will be a number of other interesting articles which will make this the most interesting number yet published.

ORTHOCLASE has been found for the first time as a druse mineral in leucite-tephrite. In the cavities of this rock were found crystals of phillipsite, calcite, adularia, altered pyrite, and calcite again in a regular order of deposition. The adularia occurred in groups covering phillipsite and also in perimorphs of calcite. Crystals of the latter mineral were covered with a druse of adularia, and showed under the microscope a rim with aggregate polarization, as if the calcite substance were gradually being replaced by adularia.

HÆMOSTIBITE is described by Igelstrom, as a new mineral from the iron mine of Sjoegrufvan, Grythyttan Parish, Sweden. It is blood red in color by transmitted light, and is found in a gangue of tephorite, in fissure with calcite, in a bed of limestone in granulite. An optical examination by Bertrand proved the mineral to be orthorhombic. The acute bisectrix is negative and is perpendicular to the easy cleavage. The optical angle is small and the dichroism very pronounced. In hardness and general appearance it approaches haussmanite. An analysis yielded :—Sb_2O_3 37.2, MnO 51.7, FeO 9.5, Mg(Ca)O 1.6. The composition is represented by the formulæ 8MnO, Sb_2O_5, or 9MnO, Sb_2O_5, which is very near manganostibite, with which the hæmostibite is identical.

WE return thanks to Mr. W. H. Bean for some fine fossils (Lower Silurian Period) sent us. Collectors will find it to their interest to buy from him, as he collects all his fossils himself. See ad. in another column.

MINERAL WOOL.—In constructing fine houses builders now pretty generally use mineral wool between the floor and ceilings. This fibrous metallic substance is produced by sending a blast of air or steam through a jet of molten slag when it flows from the furnace. Having sustained the heat of fused iron, it is non-combustible and free from organic matter, so that it cannot rot or harbor any vermin. It is completely sound proof, and may be termed an absolute non-conductor of heat, for a layer of one inch thickness, says our informant, may fuse on one side while the other will remain cool. These properties, combined with its extreme lightness, have since its introduction a few years ago as a new building material, made it a great favorite with architects and builders, and it is now largely used as a sound and fire-proof filling between floor and partitions, and in attics to keep out heat and cold.

RICH SILVER DEPOSIT.—Near Sioux Falls, Dakota, silver-bearing rock has been found in great quantities which bears from $12 to $15 of silver to the ton. The track is crossed directly through the center by the Omaha Railroad, and lies just beyond the falls in the Big Sioux River.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

Tags for Tags. Send lists. J. C. WHITSETT Golden City, Mo.

Minerals, sea curiosities, etc. Send lists. S. BIERACH, JR., 213 Grand Ave., Brooklyn, N. Y.

One Chinese coin and lottery ticket, for every perfect Indian arrowhead sent me. J. C. HIBBARD, Battle Creek, Mich.

Books, minerals, fossils, or cash, for books on geology. Send for my exchange list. F. C. JOHNSON, Boonville, N. Y.

Fifty foreign stamps for every 3 good magazines. Correspondence wanted. J. F. CAMPBELL, Johnstown, Fulton Co., N. Y.

Will exchange a V-nickel for every 25c. piece sent me, or 15 adv. cards for every 25 tobacco stamps sent me. WILLIE TYE, Spencerport, N. Y.

First class eggs of the Long-Billed Marsh Wren, in complete sets, for all kinds of Indian relics. COLLECTOR, 305 French St., Wilmington, Delaware.

Three pure carnelians for 120 different stamps. I would like to correspond with boys or girls living in Canada. WM. GENT, 801 N. Court St., Rockford, Ill.

A pair of good iron climbers with straps, for minerals, type, or any curiosity. Write what you have. All letters answered. R. P. CHANDLER, Riverside, Cal.

Will exchange 25 handsome chromo cards, suitable for a scrap book, or 40 all different postmarks for every arrowhead sent me. CHAS. S. STRAIN, Columbus Grove, Ohio.

A box of Housekeeper's Friend or a cake of Frozen Perfume for a V-nickle without cents, trilobite, or two good fossil sharks' teeth. MASON & CO., 82 Beekman St., N. Y.

I wish to exchange 174 numbers of "Youths' Companion," for books on Ornithology or for one pair of climbers, style No. 2, and birds' eggs. DE WITT HAWKS, Box 435, Waukesha, Wis.

Rare stamps to exchange for same. My collection numbers over 3200. Should like to correspond with collectors for the mutual benefit of our collections. W. P. YOUNG, Box 1594, Portsmouth, N. H.

I will exchange a good printing press in good order with one font of type and chase 2 x 3, for the best offer of coins received by the fifteenth of July. ELBERT E. SMITH, Mt. Pleasant, Iowa.

One Indian sinker, 3 x 4 in., for 6 arrowheads or 2 spearheads over 5 in. long. Two large and fine sinkers for an axe, celt, hoe, or spade sent me. Only perfect relics sent and received. J. E. WAINWRIGHT, Waukegan, Ill.

Will give 1000 well mixed foreign stamps for any of the following: 100 U. S. departments or revenues, 1000 3c. green U. S. stamps, 10 special delivery stamps. All stamps must be in good condition. Tin-tags for tin-tags. Send lists. MAT. LENNON, JR., Lock Box 38, Gilroy, Cal.

Six good fonts of type, 7 new books (well bound), entitled, Our Home in the Marshland, Holidays Abroad, Fred. Markham in Russia, Two Years Abaft the Mast, Swiss Family Robinson, Arabian Nights, and Gulliver's Travels, for the best offer of a steam engine or a paper cutter. W. S. JOHNSON, Box 249, Boonville, N. Y.

Directions and material for making one-half pint of black ink for 3 unused 2c. U. S. postcards; one picture card for 1 tin tobacco tag, or 1 picture card, not less than 10 taken. A specimen of phosphate and mica and a rubber stamp with any name on for a confederate stamp on the original envelope. A. F. EDWARDS, Thurso, Quebec, Canada.

Indian pottery (fine), pieces of axes (stone), petrified wood, calcite (from Howes Cave), actinolite, agates, chrysocolla, chalcopyrite, asbestos, tourmaline, garnets, mica, and other minerals, to exchange for Hot Spring crystals in clusters about 3x4 in., geodes, perfect arrow and spearheads and fine minerals. Send lists. G. E. WELLS, Ames, N. Y.

To exchange a printing press, type writer, microscope, shells, watch, books, papers, stamps, coins, minerals, Indian relics, birds' eggs, post marks, tin-tags, and other articles, for a bicycle, large rotary printing press, stamps of any kinds, fossils or anything else, send a list of what you got to exchange, anything it don't matter what, I will give 50 foreign stamps for every 15 revenue or official. F. N. MASSOTH, JR., Hanover Center, Lake Co., Indiana.

Acadialite, Aquamarine, Amblygonite, Ambrite, Apophyllite, Basanite, Beryl, Bismuthinite, Bournonite, Brookite, Cassiterite, Chabazite, Chiastolite, Cookite, Damourite, Descloizite, Greenockite, Grossularite, Heulandite, Hydrocuprite, Hydrozincite, Indicolite, Iodyrite, Itacolumite, Laumonite, Lepidolite, Molybdenite, Oligoclase, Orpiment, Pyrolusite, Rubilite, Rutile, Sodalite, Tetrahedrite, Thulite, Topaz, Uranite, Vanadinite, Vermiculite, Wulfenite, Zaratite, Zircon, and Zeolites, for fine minerals only. Correspondence solicited. THOMAS S. ASH, 126 Chestnut Place, West Phila., Pa.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

Some Specimens in a New York Collection.

INDIAN RELICS FROM MISSOURI.

A LARGE light-colored object hangs before me. It attracts one by its size, being 14 inches long and six wide, about an inch through at the center, rounded at both ends, the lower end tapering much more than the upper, worked on both sides and to an edge all around; material chert, used as a spade. Objects of this nature are extremely rare. Below it hangs a hoe of the same material, though much darker. In size it is eight inches by four. About two inches from the top it is deeply notched on both sides that it may be fastened by a withe to a handle. The blade is worked to an edge all around, similar to a spade. It was found at East St. Louis a few years since, in a mound which was being leveled in laying out and building a street. Doubtless it belonged to the mound-builders, as nothing of the kind is found in other places.

TWO NOTABLE AXES.

Two grooved axes hang near by. Both are well made and in good state of preservation. The grooves are wide and deep, as must be the case in one particularly, it being the "Jumbo" of axes. It is a foot long and weighs 9¾ pounds. The other is smaller, not weighing three pounds. It is particularly noticeable for its quality, being made of granite, highly polished on all sides. In contrast to these large axes I notice one equally well made, as perfectly grooved, that will not weigh more than three ounces.

PERFECT ARROWS AND SPEARS.

Of arrows and spears there is a great number. All are perfect in form, many of them being finely worked; material is a white chert. I also see many large objects of the same material, such as diggers, fleshers, smoothers, etc. This material chips almost equal to flint, and the consequence is that all the implements are mell made—I may say they are superior to most that I have seen. Missouri also abounds in iron ore, and I see before me many objects made from that material, such as grooved and ungrooved axes, celts, plumb-bobs, or, as others call them, sinkers, target stones; I should hardly say stones, but objects for target-shooting made of hematite. They are unused, therefore worthy of description. They are shaped quite like an egg, the lower end being ground flat, but so small is the flat surface the slightest touch will knock it over. When carefully placed on a level surface it will stand until hit by the arrow from the bow of the marksman. Many other specimens are here from the State of Missouri. They are varied in form, but all show the same high order of workmanship.

Result of a Freshet.

RECENTLY, during the serious spring floods which did much damage throughout Georgia, a famous "mound" field at Cartersville, owned by G. H. Tumlin, was ruined by the overflow of a river. This field contains thirty acres and was valued at $3000. Mr. Tumlin has found near what was the largest mound a number of curiosities of archæological value and great interest. They consist of ornaments, beads, and stone pottery. There is one perfect stone jug, smooth and beautifully finished. The overflow from the river seems to have unearthed an aboriginal burying-ground. Along with these ornaments and utensils Mr. Tumlin found human bones and skulls, some of which are of gigantic proportions. One of the jawbones measured three inches across at the eye-teeth. Mr. Tumlin proposes to search the proximity of the mounds thoroughly, and expects to discover more of these curious relics.

ENORMOUS deposits of the best quality of anthracite coal have lately been discovered in China.

ADVERTISEMENTS.

When answering advertisements found in this paper, please do us a favor by mentioning "Saw advertisement in THE EXCHANGERS' MONTHLY."

WORTH SENDING FOR!

We will send you post-paid, on receipt of $1.10, registered, 1 war-point, 4 good pieces pulverized steatite, 4 perfect arrowheads, 8 fine minerals, 6 rare stamps, and to introduce at once, regardless of the times, 1 genuine "Mad Stone" (very rare, really worth double above, with every lot, for this special bargain. Address at once, R. T. JAMES, Vernon Hill, Halifax Co., Va.

CURIOSITIES. Rare Sample and Catalogue 10c Will M. Clemens, Jamestown, NY

GREATEST BARGAINS!

Waterbury watches $2 75, regular selling-price $3.50. A good key-winding watch with chain and charm, only $2.50. A heavy 4-oz. case, gold plated, full-jeweled expansion, balance-movement levers. The best imitation gold watch only $6.25 by register-mail. A $3 stylographic pen complete, only $1.25. 1 doz. good pens 4c. Photographs of actresses, etc, 3 for 10c. Agents wanted. F. N. MASSOTH, JR., Hanover Center, Lake Co., Ind.

J. C. HUBBARD,
Battle Creek, Michigan.

1 Chinese Coin	6 cents.
1 " Lottery Ticket	5 "
1 " Tea Seed	5 "
1 Fan Shell	6 "
1 Fossil Shell	7 "
1 Carnelian Agate	6 "
	35 cents.

All the above sent post-paid for **only 18 cts.**

Canada orders must contain ten cents extra for postage. Chopsticks 12 cents per pair.

GEODES.

From 10 cents to $1.00.

1x1, 10 cents; 2½x2½, 25 cents; 3x3, 40 cents.

Larger ones furnished. These are good specimens and will make a good addition to any collection. W. L. BRENHOLTS, Mt. Pleasant, Iowa.

HURRAH!

BIG BARGAINS!
GREAT INDUCEMENTS!

Send stamp for particulars to

DICKINSON & DURKEE,
SHARON, WIS.

N. B.—Davie's New Key $1.00 instead of 92 cts., as heretofore stated.

APPROVAL SHEETS.

I want a good agent in every town-school to sell stamps from my sheets, send a good reference and receive one. 25 to 50 per cent. commission allowed to agents, all stamps are marked low. Address, F. N. MASSOTH, Hanover Center, Lake Co., Indiana.

BARGAINS
IN
MINERALS.

Wishing to reduce my stock of minerals one-half in order to make room for others, I will offer good sized specimens of the following at **5 cents each, 50 cents for 12, $1.00 for 25.** As I have only a few of some of these, it will be necessary to send early in order to avoid disappointment.

QUARTZ CRYSTALS,
CALCITE CRYSTALS,
CHALCOPYRITE,
FELDSPAR,
HEMATITE,
LIMONITE,
COLUMNAR GYPSUM,
ROSE GYPSUM,
FRANKLINITE,
WILLEMITE,
ZINCITE,
CALAMINE,
FERN PORPHYRY,
CANCRINITE AND ELAELITE,
CANNEL COAL,
ANTHOPHYLLITE,
CYANITE,
VULPINITE,
MOSS AGATES,
HORNBLENDE,
MALACHITE,
MARMOLITE,
GALENA,
RIPIDOLITE,
MOUNTAIN WOOD,
ROSE QUARTZ,
SELENITE,
TRAVERTINE,
STILBITE,
MICA.

Recollect that this is a **Special Sale** and only lasts for a **short time.**

Look out for the announcement of the new minerals to be added to my stock in next number.

A. CHAMBERLAIN,
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MEXICAN ✣ STAMPS.

	New.	Used.		New.	Used.
1874, 5c. brown,	$.10	$.03	1884, 25c green,	$.45	$.20
10c. black,		.04	50c. "	.75	.30
25c. blue,		.03	1 p. blue,	1.15	.40
50c green,		.15	Official red.		.50
100c. carmine,		.25	1885, 2c. carmine,	.03	.01
1878, 10c. yellow,		.03	3c. redish,	.10	.04
1879, 4c. red,		.15	5c. blue,	.08	03
1884, 1c. green,	.02	.01	6c. brown,	.10	0[illegible]
2c. "	.03	01	10c. yellow.	.15	.02
3c. "	.10	.04	ENVELOPE STAMPS		
4c. "	.06	.02	1884, 6c green,	.25	
5c. "	.08	.02	12c. "	.40	
6c. "	.12	.05	20c. "	.45	
10c. "	.15	.02	24c. "	.50	
12c. "	.25	.08	Offical red,		.75
20c. "	.35	.15	1885, 10c. yellow,	.25	

All the above are guaranteed genuine.

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WE WILL send any of the following minerals, 1x1, 3c. each; 2x2. 10c. each, post paid. Agates, calcite 3 var., chalcedony 4 var., conglomerate, honey comb coral 3 var., jasper 3 var., limestone, limonite, pink and green feldspar, quartz white, milky, smoky, drusy, crystallized and [illegible] soapstone, and hematite, all Iowa minerals. No lists.

J. C. JAY & CO.,

La Hoyt, Iowa.

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100 assorted foreign stamps for only 4c.; 50 all different 4c.; post paid. Address F. N. MASSOTH, JR., Hanover Center, Ind.

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HOUSEKEEPER'S FRIEND.

The Frozen Perfume is a delicate perfume in a solid form. Sample cake, 10 cents.

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82 Beekman St., New York City.

Humming Birds, their Nests, Eggs (new), and all kinds of rare Curios, Minerals, genuine "Mad-Stones" very rare Medals Old U. S. and Foreign Stamps, etc., at prices to suit the times, for cir's, cards, etc. Address, with stamp,

R. T. JAMES,

Vernon Hill, Halifax Co., Va.

STAMPS!

Send reference and receive by return mail an approval sheet. Price list of mineral specimens sent free. Address LANDERO & CO., ENGINEERS, P. O. Box 34, Guadalajara, Mexico.

THE EXCHANGERS' MONTHLY

[Entered at the Post Office of Jersey City, N. J., as Second Class Matter.]

VOL. I. JERSEY CITY, N. J., AUGUST, 1886. NO. 10.

Dakota Tin.

HOW THE ORE IS TREATED AT THE METALLUGICAL WORKS—GOLD IN STREAM TIN PLACERS.

THE work of treating ore from the tin mines in the Black Hills of Dakota has been in progress for some time, at the New York Metallurgical Works, Nos. 104 and 106 Washington street, and recently the process was examined by a number of men, among whom were Lewis May, John Anderson, Mr. George, manager of a large iron works in Pennsylvania and New Jersey, Prof. G. E. Bailey, and others. Over 13,000 pounds of ore and two tons of stream tin have been brought recently from the mines and placers, and many sacks and kegs, containing the metal so precious for domestic uses in the condition in which it was taken from the earth, and were placed in rooms about the large apartment in which the machinery for separating the black tin from the granite was in operation.

Stalwart workmen fed the ore to a Gates crusher, by which it was broken up. Then it was passed between Cornish rollers and further pulverized. Thence it was conducted into a "screener" for the purpose of separating the mica from the particles of tin, when the latter were turned into a vat, whence a stream of water carried them into a Golden Gate concentrator. The latter is a piece of machinery by which an incline plane, moved constant back and forth with a jerking motion, gradually carried the black tin upward till it flowed over into ore bins placed beneath, while the worthless residuum flowed in the opposite direction and fell into a receptacle, and upon examination it was found that the tin had become entirely separated from the refuse. The black tin was then dried, and after being mixed with charcoal, was ready for smelting, and after that process was run into shining pigs of pure block tin.

The ore has been brought to the metallurgical works for the purpose of testing these processes, which were found to work more economically and thoroughly than any others that have been tried, and it was stated that machinery of this kind would at once be constructed and sent to the mines, where the work of preparing tin for the market in large quantities was begun in June. The stream tin, which is black tin liberated from the granite by the process of nature, working slowly upon a plan similar to that of the new machinery, was examined with interest. In the placers near the mines the earth in which this stream tin is found contains gold in the proportion of from thirty cents to one dollar per cubic yard of earth.

"In one instance," said a man who had visited the Black Hills, exhibiting a vial of gold dust, "I got out thirty-five pounds of tin and this gold, worth over $19, from fifteen cubic yards of dirt. The gold in the placers of stream tin will pay for all the processes of placer work. The ore that is being worked here was extracted from the mine by men working under my supervision. It is the result of sampling down hundreds of tons at the mine. The sacks were sewed and sealed and boxed by me and were opened in New York in my presence, and I have been present at the tests made here. It represents only average ore from the mines. I personally cleaned up the stream tin from the Hill City district, from the sluice boxes, and separated the gold which it contained and shipped the samples to New York."

The Largest Nugget of Gold.

Louis Blanding says that the generally accepted statement that the largest nugget ever found in California was worth a little more than $21,000 is an erroneous one, says the Virginia City Enterprise. He says that J. J. Finney, "Old Virginia," found a piece of gold about six miles from Downieville, Sierra County, on the 21st day of August, 1857, that weighed 5,000 ounces. The gold of that vicinity was worth $18 an ounce, which would make the value some $90,000. This would make the Finney nugget the largest piece of pure gold ever discovered, so far as accounts go. Heretofore the Australian nugget, found in the Ballarat gold fields, has been considered the largest. It was valued at $60,000.

California Metals and Machinery.

The Pacific Coast may be termed the home of the precious metals. Every year new deposits of iron are being discovered. Utah took the lead in smelting iron; next came Oregon, and last of all, California. Six thousand tons of its product has already been used on the coast Washington Territory, too, has also contributed to the mineral riches of the coast in the department of iron. In fine, the iron departments of the coast are practically inexhaustible. Copper ores of the richest description, and producing the best quality of copper, are abundant in California and Arizona, but present prices are too low to allow of any but the richest to be mined with profit. With more railroads and cheap transportation we will add much more largely to the world's yield than we do. As a lead producer, especially in connection with silver mining, this coast has long been noted, and the smelting of lead ores has been long one of our leading industries.

Paper for Wrapping up Silver.

Six parts of caustic soda are dissolved in water until the hydrometer shows 20° B. To this solution are added four parts of oxide of zinc, and boiled until dissolved. Sufficient water must next be added to reduce the solution to 10° B. Next dip paper or calico into this solution and dry. This wrapping will very effectually preserve silver articles from being blackened by sulphureted hydrogen, which, as is well known, is contained in the atmosphere of all large cities.

Receipts.

Sympathetic Ink. – Write with milk, onion juice, or lemon juice, and let the correspondent expose to heat.

Fine Lubricating Oil.—Put fine olive oil in a bottle with scrapings of lead and expose it to the sun for a few weeks. Pour off the clear oil for use.

Water-proof Leather.—Melt 3 oz. lard and add 1 oz. powdered resin. This mixture remains soft at ordinary temperatures, and is an excellent application for leather.

White Spirit Varnish.—Rectified spirit, 1 gallon; gum sandarach, 2½ lbs. Put these ingredients into a tin bottle, warm gently and shake till dissolved. Then add a pint of pale turpentine varnish.

Silvering Powder.—Nitrate of silver, 30 grains; common salt, 30 grains; cream tartar, 200 grains. Mix. Moisten with water and rub on the article with wash leather. Gives a white silvery appearance to brass, copper, etc.

Pure Gold Lacquer.—Best pale shellac (picked pieces), 8 oz.; sandarac 2 oz.; turmeric, 8 oz; anatto, 2 oz.; dragon's blood, ¼ oz.; alcohol, 1 gallon. Mix, shake frequently till the gums are dissolved, and the color extracted from the coloring matters, and then allow to settle

To Dissolve the Silver off old Plated Goods.—Mix 1 oz. of finely powdered saltpetre with 10 oz. sulphuric acid and steep the goods in this mixture. If diluted with water it acts on copper and other metals, but if very strong it dissolves the silver only, and may be used to dissolve silver off plated goods without affecting the other metals.

Description of the Zinc Mines at Friedensville, Pa.

By Charles S. Mason.

A few days ago I went on a tramp to Friedensville, Pa., after minerals. This town has probably 1,000 inhabitants, and lies nestled among the hills, about four miles from Bethlehem and five miles from Allentown, Pa. Here are found extensive deposits of zinc, and two large pits or beds are now being worked. Each bed is about 350 ft. wide by 1,000 ft. long, and all workings in the mine are carried on in the open air, just as in marble or limestone quarries; scarcely any tunnels are made, excepting between wide layers of rock, where the deposits of zinc silicate (Calamine) are found. The ore is hoisted out of the mine by the aid of a small dummy engine, which works independently of the large pumping engine. The following description of it appeared in the Scientific American Supplement, Vol. II., No. 32:

"The engine has a pumping capacity of 15,000 gal. per min., and can be made to run 19,000 gal. per min. in case of an emergency. The water is raised from a depth of 350 ft. The President (the name of the engine) weighs 650 tons, and, including the pumps and boilers, the total weight is 1,000 tons. The cylinder is 110¼ inches in diameter; length of stroke 10 ft. The heaviest pieces of iron in the engine are the sections of the walking beams, each of which weighs 24 tons. The fly-wheels weigh 75 tons each, and the crank pins 1 ton each. The piston-rod is 14 inches in diameter, the crosshead weighs 8 tons, and the connecting rods have 9 in. necks and are 15 in. in the middle, 41 ft. 2½ in. in length, and weighs 11 tons each. There are two air pumps each 50 in. in diameter. The engine drives four plunger pumps, each 30 in. in diameter by 10 ft. stroke, and four lifting pumps, each 31½ in. in diameter by 10 ft. stroke.

The plunger pumps are uppermost and stationary and the lifting pumps are in the bottom and movable so as to go up and down as the shaft is sunk. To handle these lifting pumps, and for hoisting or lowering them at pleasure, a steam capstan, capable of lifting 50 tons vertically, is used. The capstan is worked by a series of string gearing, a drum, and a steel wire rope. With this capstan, if anything goes wrong with the pumps, they can be taken hold of by the top, pulled out of the water, repaired and put back again in a very short time."

This is about the largest fixed single engine in the world, that at Harlem Weer being a compound engine with one cylinder within the other.

It was thought of very strongly, at one time, to lay iron pipes from Friedensville to Philadelphia, to supply the latter city with drinking water, as the water which is pumped out of the mines is very clear, clean, and pure. For some reason, however, this giant scheme fell through. While a description may be very exact in every detail and part, still this fails to convey the immensity that immediately stamps itself on the mind of one who looks on the engine for the first time.

The engine-works and ground belong to the Lehigh Zinc Co., who have erected large smelting and ore-reducing works. This company have within the last year added oxide works, which they moved from Bergen Point, N. J.

In and around the mine very fine specimens of massive blende, calamine, sulphur, iron pyrites, calcite, quartz, greenockite, blue and red carbonates of zinc, and various coatings are found. Iron pyrites or sulphur and blende is called Mundig by the miners. As a general rule, the miners are willing to give or show where fine specimens are to be found.

Experiments have been made in Middlesborough with liquid fuel for ships. One of the most successful has been with the steamship Emanuel, which was fitted with tanks to hold the oil—a waste product from the Middlesborough Chemical Works. The steamer has just returned from a trip on the Mediterranean, and the engineer reports most favorable results.

THE
EXCHANGERS' MONTHLY.

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THOS. CHAMBERLAIN, JR.

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Per Page	2.00

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THOS. CHAMBERLAIN, JR.,
284 Pavonia Ave., Jersey City, N. J.

In our next number will appear at least four original articles, namely : "Wonders of the Rocks," by the author of "Collecting with an Object in View;" "How we Explored a Cave," by F. R. Stearns ; "How to Prepare Mineralogical Slides by an Easy Method," by Thos. S. Ash ; and an article by Mr. Wigglesworth. These we believe, together with the other interesting articles contained in it, will make it the most interesting number yet published. Now is your time to subscribe.

A tunnel is to be built to facilitate the mining of the sulphur deposits of Popocatapetl in Mexico. Four-fifths of the world's supply now comes from Sicily.

It is said that underground wires, covered with chemically prepared palmetto fiber have stood remarkable tests without failure, and for covering single or few wires that substance is probably the best and cheapest covering now known.

According to Wroblewski liquid oxygen and nitrogen rank among the most perfect electric insulators. The resistance of copper decreases much more rapidly than the absolute temperature, and approaches zero at a temperature not very remote from that obtained by evaporating liquid nitrogen in a vacuum.

According to M. Guillemin, the tenacity of copper is greatly increased, even as much as 50 to 100 per cent., by the addition of a small percentage of cobalt. The alloys are all red.

It is a well known fact that antimony is to be found in cotton yarn which has been dyed with analine colors, so that unless great care is taken in the cleansing of the yarn, it is possible for such a quantity to remain as to be injurious to the skin.

A French geologist, Mons. DeLapparent, lately called the attention of the Paris Geological Society to the effect gravitation has in heaping up sea-water about the land. The continents are thus all situated at the tops of hills of water, and in crossing the Atlantic the ship has first to go down hill, then to cross a valley, and finally to climb another hill. The calculation has been made that in mid-ocean the surface may be more than half a mile (1000 meters) below the level it would have if the continents exerted no attraction.

We would again call the attention of advertisers to the fact that there is but two more months in which to close contracts for long-time ads. in this Monthly at present rates, as commencing with our Second Volume we shall double our present rates. Until then we will accept ads. for any length of time at present rates, which is far below that of any other Monthly of our standard and circulation. So now is the time to make your contracts for the next year.

Rock Soap is a mineral composed of silica, alumina, peroxide of iron, and water. It is earthy, easily broken, black or nearly so, very soft, and easily cut with a knife, is greasy to the touch, and adheres to the tongue. It is valued by painters for crayons. It is found in a number of places on the coast of Europe and occurs in trap rock on the Isle of Skye. It is only found massive.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

Specimens of different kinds in exchange for printing. Box 199, Wilmington, Del.

Fine arrowheads and coins to exchange for minerals and fossils. WILLIE T. MILLER, Box 45, Parkersburg, W. Va.

I will give 20 foreign stamps for every 100 U. S. stamps sent me. Only good ones will be sent. ADOLF BLUM, Helmetta, N. J.

Rare U. S. and foreign stamps, minerals, Indian relics and sea curiosities, for revolvers, watches, and type-writers. JAMES C. JAY, La Hoyt, Iowa.

Don Quixote, a good book, for a baseball book. Would prefer one in which curve pitching is dealt with. I. J. T. MUSGROVE, 266 Lisgar St., Ottawa, Canada.

125 copies of the "Youth's Companion," for a pair of climbing irons or the best offer of birds' eggs or old coins. W. Y. ROBINSON, Waukesha, Box 174, Wis.

A genuine mad stone, price $25.00, for a fine watch of equal value. Also $200 00 worth good new books, etc., for suitable offers. S. P. SEAWELL, P.M., Bensalem, Moore Co., N. C.

125 varieties old stamp and coin papers, books, stamps, and novelties for printing material, birds' eggs, coins, or offers. Correspondence desired. JAMES ANDERZEN, College Springs, Iowa.

Fifty varieties foreign stamps, or 2 numbers "Leisure Hour Library," for 12 varieties match, medicine, document, old U. S. postage or department stamps. HERBERT BRICKER, Slate Lick, Pa.

Shells, minerals, fossils, a foot-power scroll-saw, tool-handle containing a doz. tools, a set of six imported English files, and an oil-painting for a spy-glass, microscope, or books. W. F. HALLOCK, Chester, Conn.

Vol. 110, "Youth's Companion" (complete and in good condition), for any volume of "Golden Argosy," "Harper's Young People," or "Treasure Trove," bound or unbound, or minerals. EVAN W. THOMAS, JR., Box 2274, Ocean Grove, N. J.

Five good carnelians, several colors, for 100 varieties foreign or revenue stamps. Three for ten departmental stamps. Porcupine quills, fossils, and minerals for stamps. Ten foreign stamps for every stamp or natural history paper. F. R. STEARNS, Elkader, Iowa.

I would like to exchange Cora O'Kane, or the Doom of the Rebel Guard, or either of the following: The Museum or Littel's Living Age, for Our American Youth No. 4. H. L. BRAGG, Tunbridge, Vt.

A rubber stamp outfit, will print any name; consisting of a 4 A font of rubber type, bottle of indelible ink, pad, tweezers, holder, spaces, and quads, with full directions, a fine geode, two perfect flint and one agate arrowhead, for the best offer of fine minerals. A. HAMBURGER, P. O. Box 1, North Wales, Pa.

1500 tin tags, a collection of foreign stamps and postmarks, a full-sized pattern and directions for making and sending up tissue-paper balloons, some good books, some picture cards, some Indian arrowheads and some other articles for the best offer of a good flute, piccolo, clarinet, or cornet in good order. JOHN DWYER, Mount Pleasant, Iowa.

Twenty-five European stamps for every fossil sent me (post-paid). One for every tin tobacco tag. A rare Confederate States stamp for every one from Curacao, Selangar, Borneo, Cundinamarcia, every specimen of Indian pottery, geode, relic, five foreign coins, agate, or ore. ROBBIE McMASTER, JR., 903 Sixth Ave., New York City, N. Y.

To exchange a printing press, type writer, microscope, shells, watch, books, papers, stamps, coins, minerals, Indian relics, birds' eggs, post marks, tin-tags, and other articles, for a bicycle, large rotary printing press, stamps of any kind, fossils or anything else. Send a list what you got to exchange, anything, it don't matter what. I will give 50 foreign stamps for every 15 revenue or official. F. N. MASSOTH, JR., Hanover Center, Lake Co., Indiana.

Analcite, apatite, arsenopyrite, apophyllite, azurite, barite, brucite, boltonite, byssolite, calcite, cerussite, chalcopyrite, cryolite and chalybite, celestite, chabazite, franklinite, hematite, heulandite, leucite, magnesite, natrolite, nuttalite, pyrite, pyromorphite, drusy quartz, rutile, selenite, stilbite, radiated and crystalized, sphalerite, scapolite, vesuvianite, vivianite, vermiculite, and arrowheads, for crystalized minerals, works appertaining to mineralogy, a dictionary or encyclopedia. F. J. LEWIS, 710 N. 22d St., Phila., Pa.

Wanted, autograph letters and signatures of Henry Clay, Horace Greeley, Sam. J. Tilden, J. C. Calhoun, John Adams, Th. Jefferson, James K. Polk, Andrew Johnson, and many other noted persons, whether living or dead. Will give in exchange for the above, V-nickels without cents, colonial cents, U. S. and foreign coins; rare U. S. postage, revenue and medicine stamps, also foreign stamps, confederate bills of 1861, '62, '63, '64, wild-cat currency, and over a hundred autographs. Write me. WILLIAM FISHER CORNELL, Kalamazoo, Mich.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

"That Rotten Material."

WE are obliged to write an opinion on an article from the pen of Mr. Wigglesworth, which appeared in the May issue of the EXCHANGERS' MONTHLY. In speaking of a "rotten material" found over skeletons in a West Virginia mound, Mr. Wigglesworth is of the opinion that this "rotten material" was once a tent and that the bodies were buried under it and then earth thrown over it, and that owing to the weight of the earth on the tent it fell in and thus made the depression which was found in the top of the mound. Mr. Wigglesworth further states that this theory may also apply to similar depressions found in mounds near their crest. Here we disagree. The "rotten material," we believe, was a blanket thrown over the dead bodies. We cannot recall any theory ever advanced as to the construction of mounds over tents Many mounds were built by dumping baskets of earth, one upon and at the side of the other. Yet Mr. Wigglesworth may be right and we may be wrong.—NATURALISTS' COMPANION.

A MASS of bones, supposed to be those of Indians, have been discovered on the banks of the Choptank river in Dorchester County, Md. A remarkable feature of the discovery is the fact that in all the skulls found the teeth are perfect and without a blemish. The bones are in some instances immense. While indications point to an Indian burying-ground, the great mass of bodies unearthed give rise to the theory that they are Indian warriors who fell in battle and were buried in a heap. The bank is also giving out large marine shells and other fossils of interest to geologists.

MANY arrow and spearheads of poor workmanship have been found in the vicinity of Spotswood, Middlesex County, New Jersey.

Lost in Mammoth Cave.

TERRIBLE EXPERIENCE OF AN EXCURSION PARTY—WITHOUT LIGHT OR GUIDE.

ON July 8th a party of well known ladies and gentlemen returned from a pleasure trip to Mammoth Cave, where they had a most thrilling and painful experience. On Tuesday, July 6th, a gay party of twenty-seven persons traversed the cave, taking the "long route'—nine miles in and nine miles out. During the evening, while the party were travelling through the winding passages beyond Echo River, nine of them, who were in the rear, became separated from the main body. The only guide was at the head of the line, and the absence of the rear guard was not noticed for some time. The unfortunates were lost for eight hours in the intricate underground mazes of the mighty cavern. From one till nine o'clock at night they wandered about aimlessly but constantly getting further and further away from the main track. To add to the terror of the situation, their lights went out, leaving them to wander on in the darkness and unknown dangers of the cavern. The wanderers finally adopted the plan of leaving small articles of clothing in their path as they walked along, and by these means they were finally found by the party of friends who were sent in search of them sitting on the banks of Echo River, to which they had finally arrived.

The ladies in the party suffered greatly from nervous excitement, and the excursionists were pretty badly broken up by the time they got back to the hotel.

SIGNOR BOMBICCI supposes the detonation of meteors to be that of an explosive gas formed during the surface heating of the mass in the atmosphere, and accumulating chiefly in the vacuous space left behind the mass in its very swift flight.

THE Island of Arran, off the west coast of Scotland, is said to be so mild that palms and camellias thrive in the open air, without injury in winter, although the latitude is that of the northern part of Labrador.

ADVERTISEMENTS.

When answering advertisements found in this paper, please do us a favor by mentioning "Saw advertisement in THE EXCHANGERS' MONTHLY."

Humming Birds, their Nests, Eggs (new), and all kinds of rare Curios, Minerals, genuine "Mad-Stones." very rare Medals Old U. S. and Foreign Stamps, etc., at prices to suit the times, for cir's, cards, etc. Address, with stamp,

R. T. JAMES,
Vernon Hill, Halifax Co., Va.

$10, **a day at your own home, business can be learned in an hour and will bring you in more money than anything else, valuable outfit FREE by sending 10 cts. for postage to MASON & CO., 82 Beekman St., New York City.**

INK SEND 20 cents and receive a package of ink powder, which will make from a pint to a quart of good ink. Colors: Black, Blue, Purple, Violet, Red, and Green. 6 packages, $1 00. 150 mixed foreign stamps, 10 cents. Fine specimens of Geodes from 10 cents to $1.00.

LEMMIE H. HENRY,
Box 227, Bonaparte, Iowa.

YES, I WILL!

I will give a set of 1875 Guatamala (unused and complete), to the first person who replies to this ad. and *mentions this paper.*

I have one of the finest stocks of stamps in America, and I want 999 more agents to sell stamps from my unexcelled

"WORLD-RENOWNED"

APPROVAL SHEETS!

I allow 25 to 33⅓ per cent. commission, according to how much you sell, and besides this my stamps are

Cheaper than the Cheapest!

Prizes given to agents. Address,

W. G. WHILDEN, JR.,
Atlanta, Ga.

MAZON CREEK FOSSILS.

Having about 200 of these celebrated Fossils, which I wish to clear out, I am offering them at 15 cts. each, 8 for $1. A. CHAMBERLAIN, 284 Pavonia Ave., Jersey City, N. J.

BARGAINS
IN
MINERALS.

Last month I gave a list of bargains for Amateur Collectors. This month I offer a number of bargains for Advanced Collectors.

◆

POLISHED JASPERIZED WOOD,
ALMANDINE GARNETS,
POLISHED STALAGMITES,
BLADED TREMOLITE,
POLISHED AGATES.

25 cents each.

FIBROUS MALACHITE,
AZURITE CRYSTALS,
NATIVE GOLD,
NATIVE SILVER,
NATIVE COPPER.

50 cents each.

PRECIOUS GARNETS,
CINNAMON GARNETS,
CUPRITE CRYSTALS,
ENG. CALCITE CRYSTALS,
IRON GARNETS.

75 cents each.

WULFENITE,
CERRUSITE,
FLUORITE CRYSTALS,
ENG. ARAGONITE CRYS.,
ENG. BLENDE CRYS.

1 dollar each.

For sale by

A. CHAMBERLAIN,
284 PAVONIA AVE., JERSEY CITY, N. J.

5 Rare War Cents, 10 c.

3 Foreign Coins, 10 c.

Continental and Colonial paper money.

Send stamp for price list. Or 5 c. for a rare foreign coin and price list.

LEE E. BRIDGE,
Bonaparte, Ia.

⇝MEXICAN ✻ STAMPS.⇜

	New.	Used.
1874, 5c. brown,	$.10	$.03
10c. black,		.04
25c. blue,		.03
50c. green,		.15
100c. carmine,		.25
1878, 10c. yellow,		.03
1879, 4c. red,		.15
1884, 1c. green,	.02	.01
2c. "	.03	01
3c. "	.10	.04
4c. "	.06	.02
5c. "	.08	.02
6c. "	.12	.05
10c. "	.15	.02
12c. "	.25	.08
20c. "	.35	.15
1884, 25c. green,	$.45	$.20
50c. "	[illegible]	.30
1 p. blue,	1.15	.40
Official red		.50
1885, 2c. carmine,	.03	.01
3c redish,	.10	.04
5c. blue,	.08	03
6c. brown,	.10	[illegible]
10c. yellow,	.15	.02
ENVELOPE STAMPS		
1884, 6c. green,	.25	
12c. "	.40	
20c. "	.45	
24c. "	.50	
Offical red,		.75
1885, 10c yellow,	.25	

All the above are guaranteed genuine.

Correspondence received in Spanish, English, French, and Italian, and promptly attended to.

TERMS: Sent post-paid on receipt of price. Remittances can be made by registered letter, in bank-note, or unused stamps, any countries of the world, of low denomination. On orders of $2 or more, 10 per cent discount is allowed.

Speciality of sheets of stamps on approval, to parties furnishing satisfactory references or deposit. Address

SCHIAFINO & CO.,

P.O. Box 74, *Guadalajara, Mexico.*

SPECIAL COLLECTIONS,

Illustrating the Ores and Metallic Minerals. Minerals used in the manufacture of chemicals, drugs, porcelain, and other household ware, the ornamental and mechanical arts, and those used for heat and light. The Metallurgy of any metal put up to order. 15 specimens $1.50.

THOS. S. ASH,

126 CHESTNUT PLACE, WEST PHILADELPHIA, PA.

L. S. FOSSILS. Named collections or single specimens, for schools or individuals, at very low rates.

W. H. BEAN, Naturalist, Lebanon, O.

100 assorted foreign stamps for only 4c.; 50 all different, 4c.; post-paid. Address

F. N. MASSOTH, Jr., Hanover Center, Ind.

STAMPS!

Send reference and receive by return mail an approval sheet. Price list of mineral specimens sent free. Address LANDERO & CO., Engineers, P. O. Box 34, Guadalajara, Mexico.

WORTH SENDING FOR!

We will send you post-paid, on receipt of $1.10, registered, 1 war-point, 4 good pieces pulverized steatite, 4 perfect arrowheads, 8 fine minerals, 6 rare stamps, and to introduce at once, regardless of the times, 1 genuine "Mad-Stone" (very rare, really worth double above), with every lot, for this special bargain. Address at once, R. T. JAMES, Vernon Hill, Halifax Co., Va.

SOMETHING NEW!

THE ARIZONA MINERAL COLLECTION,

PUT UP BY

MR. WILLIAM NIVEN,

Late-Assistant Commissioner, Arizona Territory,
World's Fair, New Orleans

ONLY 50 CENTS A BOX.

This is the most attractive collection that has yet been put in the market, and should meet with a large sale. It consists of 12 specimens packed in cotton in a partitioned box, each accompanied by a printed list giving name of mineral, composition, etc., together with an engraving of the Natural Bridge, Chalcedony Park, Arizona Territory, which is made entirely of the wood of which this collection contains a piece Each box contains:

Fluorite,
Free Gold,
Chalcocite,
Malachite,
Chalcopyrite,
Smoky Quartz,
Native Copper,
Jasperized Wood,
Azurite Crystals,
Cuprite on Limonite,
Argentiferous Galena,
Argentiferous Quartz.

For sale by

A. CHAMBERLAIN,

284 Pavonia Ave., Jersey City, N. J.

INDIAN ARROWHEADS,

670 East 11-nd Street,
New York City.

Mr. Joseph Wigglesworth,
Wilmington, Delaware.

Dear Sir:—The Indian arrowheads that I ordered a few days ago arrived all safe and I am well pleased with them The promptness in filling my first order, the quality and quantity of the goods, together with their low price, leads me to give you this second order.

Respectfully,
S D. Sammis.

INDIAN ARROWHEADS ON APPROVAL.

Send any amount of money and receive by return mail specimens to that amount Money will be promptly returned for all specimens sent back.

JOSEPH WIGGLESWORTH,
Wilmington - Delaware.

APPROVAL SHEETS.

I want a good agent in every town-school to sell stamps from my sheets, send a good reference and receive one 25 to 50 per cent. commission allowed to agents, all stamps are marked low. Address, F. N MASSOTH, Hanover Center, Lake Co., Indiana.

THE
EXCHANGERS'
MONTHLY

[Entered at the Post Office of Jersey City, N. J., as Second Class Matter.]

VOL. I. JERSEY CITY, N. J., SEPTEMBER, 1886. NO. 11.

Wonders of the Rocks.

By Aron Hamburger.

The wondrous wisdom and mighty power of God may be seen in the humblest works of His creation.

The rocks are pictorial histories of bygone ages written by the hand of God himself.

By the various formations and strata, and by the fossil remains of animal and plant life so often discovered, we are enabled to determine the age in which many extinct species of animal and plant life flourished; and perhaps, also, privileged to admire the same flowers, as did Adam and Eve in Eden.

Nature's mineral products, placed in comparison with those of organic life, are prolific in interest.

Who has made at any time that which surpasses or even equals the brilliancy and extreme hardness of the diamond? What living person ever successfully reproduced the exquisite coloring seen in the ruby, sapphire, turquoise, or emerald? Which of the learned alchemists found the means of transmitting lead into gold?

These products of nature were never intended to be reproduced by man, and he knows all it is intended he shall know of the mysteries of creation.

The human family derives many of the comforts and luxuries of life from those unfailing sources, the rocks.

In the Winter Palace of the Czar, at St. Petersburg, are many handsome mantels cut from solid malachite, which is a beautiful and expensive carbonate of copper.

In Mexico is found a variety of volcanic glass, spotted with red, which is rare and precious. It is scientifically known as obsidian.

In Arizona is a grove called "Chalcedony Park," which contains large numbers of jasperized and agatized trees. From the cavities of hollow trees in this park have often been taken large and beautiful clusters of amethyst quartz. Here, also, is a natural bridge formed by an agatized tree, which stretches across a canon. It is 100 feet long and $3\frac{1}{2}$ to 4 feet in thickness.

Fingal's Cave, on the Island of Staffa, off Scotland, and the Giant's Causeway, in Ireland, are composed of columns of basalt, a hard, greenish black rock.

The quartz crystals from different localities are remarkable, as their shape is generally mathematically accurate. Iron pyrites occur crystallized in steatite in an almost cubical form. In some creek beds are found geodes or hollow nodules lined with chalcedony or quartz crystals; they are remarkably beautiful and curious. One of the most highly prized of the precious stones is the emerald. A large specimen free from flaws is seldom found.

In the creek beds, quarries or mines of different countries are many interesting fossil remains, chiefly of the Devonian and Carboniferous ages. They consist chiefly of corals, ferns, lilies, shellfish, and parts of animal skeletons.

The ferns are sometimes found on the creek bottoms enclosed in iron-stone nodules. The fossil corals, sponges, shell-fish, etc., are supposed to lie in the bed of what was once a mighty ocean. Owing to some great convulsion of nature this ocean receded leaving these formations.

In a colliery in Pennsylvania was exhumed a tree completely carbonized, with each bough and leaf intact. It was seen among the Pennsylvania exhibits at the Centennial Exposition, in 1876.

It is well nigh impossible to freely gather specimens in these famous fossil localities, as that individual who seeks money rather than science appears early upon the scene. He hires the sole right to collect, and then charges the lover of paleontology exorbitant prices for his specimens.

In the museum of the Philadelphia Academy of Natural Sciences are some very interesting and valuable paleontological specimens. The most conspicuous of these are skeletons of an extinct Irish elk and an immense lizard, and many fossil foot-prints. These foot-prints in solid stone are those of mammoth mammals and birds, but many are supposed to be those of prehistoric man. The enormous skull and bones of the mastodon also attract considerable attention.

On the Baltic, amber containing insects and leaves is often picked up. This proves conclusively that amber is a fossil gum.

Flexible sandstone (Itacolumite) is quarried principally in North Carolina, and is, as its name indicates, very elastic. Slabs of it may be bent nearly double.

Crystals have been observed to contain single drops of water in their centers.

Dendrite, moss agate, and psilomelane, owe their beautiful appearance to chemical formations, and not to ferns and mosses, as is often supposed.

And so we might go on and name hundreds of other wonders of the rocks and still not give them all, so will close by saying, look around for yourself and you will soon find there is more interest in this science than you expected, and more wonders than can be told.

Diamonds Found in Illinois.

AN IMPORTANT DISCOVERY SAID TO HAVE BEEN MADE NEAR SPRINGFIELD.

A WRITER for a local Springfield, Ill., paper asserts the he has recently found in a gravel stratum along the Sangamon river, in this county, three rough diamonds of the first water, and at least a dozen topazes, all found in the same locality. He also states that he has found a large number of pearls in mussels from the Sangamon. The gentleman, whose name is not given, is vouched for as a man of trustworthiness and education, and is understood to have had experience in the diamond mines of Brazil. These stones have already been tested by an experienced lapidary and pronounced to be diamonds. The topazes are easily distinguishable as such. They are all large enough to be cut to fair advantage. While the finder lays no claim to having made anything like an extensive discovery, he believes occasional precious stones will be found wherever this stratum of gravel overlies the limestone. He is reticent about the exact place of the find, but it is known to be within less than eight miles of Springfield.

* * *

Receipts.

Varnish for Browned Iron.—Shellac, 1 oz ; dragon's blood, three-sixteenths of an oz ; alcohol, 1 quart.

Stopping Holes in Castings.—Eighty parts of sifted cast-iron turnings, two parts of powdered sal-ammoniac, and one part sulphur made into a thick paste with water and mixed fresh for use makes a good cement

Green Transparent Varnish for Metals.—Grind a small quantity of Chinese blue, with double the quantity of finely-powdered chromate of potash (it requires the most elaborate grinding); add a sufficient quantity of copal varnish thinned with turpentine. The tone may be altered by adding more or less of one or the other ingredients.

Black Ink.—In 1 gallon of water boil 1lb. bruised Aleppo galls for two hours and strain when cold. Dissolve 5½ oz sulphate of iron and 5 oz. gum arabic in as little water as is necessary and mix the two liquids with constant stirring. Keep in a tall bottle, allow it to settle for some days and it will be ready for use.

How We Explored a Cave.

By F. R. Stearns.

There is a farm about eight miles from Elkader, Iowa, which is the queerest place it has ever been my luck to visit. It abounds in sink-holes and caves, and seems to be hollow under ground in many places. Not long ago the owner dug a cistern. The digger was just giving the finishing touches when his spade went through and he barely missed following. A lantern was lowered 80 feet without finding bottom. Last 3rd of July, I with three others drove out with the intention of exploring a sink-hole which the owner had considered too dangerous to attempt to explore.

We tied a stout rope to a tree at the top and lowered ourselves hand-over-hand, one after another. We found pretty good foothold in the rocks and ice on the side. We lowered ourselves until we had reached the first floor, which was 145 feet from the top and had straight walls on either side about ten feet apart. This floor was always supposed to be a thin crust and we therefore made our way carefully over it. We walked along about 50 feet and then found a hole which opened straight down.

By this time we were so cold that we thought best to go up and get warm, after which we again descended carrying another rope. We tied the rope to a stump which stood imbedded in dirt and ice, and one of us, carrying a lantern, let himself slowly down a steep incline covered with ice, for about ten feet He could then see bottom about ten feet below him. He let himself down by means of the rope and the rest followed. We walked a short distance ahead and found ourselves in a large cavern. It was about 80 ft. long, 40 ft. wide and 40 ft high. The top was solid rock and rounding as evenly as an arch. The floor was of wet clay from the constant dripping of water The further end was closed up with rich dirt, which showed that it had but recently caved in. I was pushed up to the top, by the other boys, to a place where it looked as if the cave might be continued. But it only went about 30 ft. We retraced our steps, and followed the cave in the opposite direction about 50 feet, where it was stopped up by drift-wood. There we found a clear pool of the coldest water I ever drank.

We explored one more place and that was a very tight one, as I can tell from experience.

I was lowered with the lantern down a hole 30 ft. I then found a cave which branched off. I followed it for 20 ft. and nearly stepped in a small pool of water about 2 x 2 ft., I dropped a rock in and it sounded so loud and hollow it scared me. I then had a stick lowered to me and dropped it in. It disappeared and I never saw it again. I don't like water that won't float a stick and got out about as lively as I knew how. The boys said, that to them up above, the rock I dropped in sounded more like thunder than anything else. We intend to explore more of the passages some other day, and some of the other caves.

Having recently made an assay of a gold ore from the vicinity of Constantinople, Dr. A. B. Griffiths believes that the following remarks may interest metallurgical chemists: The gold is disseminated in very small pieces here and there throughout a quartz and earthy matrix. The ore comes from mines which have not been worked for several centuries, and were thought to be exhausted of gold. The assay, both by dry and wet methods, of a carefully selected sample, gave three ounces fourteen pennyweights of gold per ton of ore. The gold in the ore contains iron and copper, and a very small quanity of silver. The matrix is composed chiefly of quartz, but contains calcium carbonate, ferric oxide, alumina, and lime.

The cataracts of the Nile are due to granite veins which the river, while working a way through the sandstone, has been unable to destroy or remove.

Danger signals are used in the mining centers of England to make known such atmospheric changes as may affect the workings of the mines.

THE
EXCHANGERS' MONTHLY.

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THOS. CHAMBERLAIN, JR.

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Address all subscriptions and communications to,
THOS. CHAMBERLAIN, JR.,
284 Pavonia Ave., Jersey City, N. J.

IN our next number, which will finish the first year of this monthly, will appear an interesting article by T. O'Conor Sloane, Ph.D., on "Experiments with Lycopodium;" also an article on "Geology, the Standard History," by Aron Hamburger; and "The Orthoceratite," by Franklin C. Johnson. Besides these, there will be the articles by Mr. Wigglesworth, and the usual amount of other interesting matter.

BAUXITE is the name of a mineral found in France, which consists chiefly of alumina or oxide of aluminum. It is used principally as a convenient source from which to extract that metal. The process is a very tedious and expensive one. Cryolite was the mineral first used in its manufacture. Aluminum was discovered in 1828 by a chemist named Wohler.

A SWISS mineralogist, Mons. A. Lacroix, has artificially produced crystals of gypsum by treating pulverized fluorite with sulphuric acid, and then adding water, which, when allowed to stand several months at a low temperature until the liquid had wholly evaporated, left crystals of gypsum.

THE most abundant rocks in the Cascade range of Northern California, are found to be the hypersthene andesites. The eruptive matter thrown out by Mount Shasta is chiefly of this kind.

How to Prepare Mineralogical Slides, by an Easy Method.

By THOMAS S. ASH.

CHIP off a flat piece of the specimen at least 1½ c. c. square; then rub down one side on a piece of wrought iron 20 c. c. square with coarse emery until one surface is nearly plane, without holes or cracks; then rub on a plate of glass of the same dimensions, one side of which is ground, not polished, with flour of emery, and make the surface of the specimen as true as possible. Then clean well with a stiff brush and water. Now take a little Canada balsam and boil it in an iron spoon until a drop of the balsam will, when cold, be hard enough to resist the pressure of the finger nail, without being brittle. With this balsam, cement the ground surface of the specimen to a piece of glass 2·5 c. c. square, care being exercised to have the specimen perfectly dry, and to prevent the formation of any air bubbles, as this would cause the specimen to break when ground down very thin. After this is cold, grind the other side down in the above named manner, until you have the specimen sufficiently transparent. Now clean the slide well, taking off all the balsam from around the specimen with a fine knife, wash well with water and a stiff brush and dry the slide well. After dry, with a little balsam, cement a cover to the slide and let the balsam set. After the balsam is perfectly dry, clean the slide well with spirits of turpentine, put your label on, and the slide is finished.

Sometimes the glass slide will be scratched, and if you desire a first class slide you can transfer the film to another clean glass by gently warming the slide until the balsam gets soft and with a fine needle you can remove the film to a new clean glass upon which has been dropped one or two drops of the above Canada balsam, and then finish the slide in the above named manner.

R. BRAUNS, proposes the use of methylene iodide as a means of separating the constituents of rocks.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

Tin-tags for same. Send list. C. D. R., Box 836, Rock Island, Ill.

A goblet turned out of wood for 60 different foreign stamps. WM. GENT, Jr., 801 N. Court St., Rockford, Ill.

Montana minerals and rare botanical specimens for books. Send lists. A. C. KENNEDY, Blatchford, Custer Co., Montana.

I will exchange a 35-cent magazine for every 25 good foreign stamps. WM. H. EAGLESON, 221 East 118th St., New York City.

Tin-tags and Post-marks for tin-tags. Send list. Will exchange numbers of Golden Days or will pay cash for tin-tags. Send offer. G. S. BRUSH, 16 Pear St., Zanesville, O.

Will exchange books of all kinds for anything antique and curious, autographs, letters, etc. Send list of what you have with your price. BOOKS, 91 Dearborn St., Chicago, Ill.

Rare foreign postage stamps to exchange for others. I especially desire uncancelled specimens. Correspondence desired with advanced collectors. W. P. YOUNG, Box 1594, Portsmouth, N. H.

I will exchange 12 fossils for every V-nickel without the word cents on sent me, or 3 fossils for every large or eagle U. S. cent. Coins must be in good condition. E. E. SMITH, Trenton, Iowa.

Garnetiferous mica schist, limonite, red hematite from Corsica, calcite crystals, chalcopyrite, galenite, peacock coal, white and pink feldspar, for minerals. Dealers in minerals please send price lists. A. HAMBURGER, Box 1, North Wales, Pa.

Fifteen varieties or 50 mixed foreign stamps for each stamp or coin paper sent me. If you have any papers to exchange for others or anything else write to me. I have tags, cards, stamps, etc., to exchange. ULYSSES CLARK, Pipestone, Minnesota.

One European stamp for every tin-tag, one rare U. S. local stamp for specimen of petrified wood or native copper. 5 very rare stamps for every stamp paper sent me for 1 year. Rare stamps to exchange for others or minerals. ROBBIE McMASTER, 903 Sixth Ave., New York City.

A small collection of tin-tags, 956 different and 500 duplicate post-marks (many foreign) in a neat book, arranged alphabetically (square cut), 150 back numbers of Harpers' Young People, and 20 different birds' eggs, to exchange for fossils, minerals, coins, Indian and Mound-builders' relics, or type. All offers answered. W. H. TAYLOR, North Wales, Pa.

Two hundred and fifty numbers of Harper's Young People, magazines, foreign coins, and many other articles for fine crystallized minerals. A. C., 284 Pavonia Avenue, Jersey City, New Jersey

Will exchange for anything worth 25 cents, either of two following receipts: for making 16 different colors of writing ink, including gold and silver, and for making artificial honey, apple butter and cider. Nothing refused. WM. FRETZ, Box 9, Stockton, N. J.

A large Ruby magic lantern with 45 fine colored and photographic slides, chromotrope, etc., cost $12.00, for a nickle-plated, stem-winding watch, stem-setter, or for books by Optic, Trowbridge, or Verne. A "Tom Thumb" self-inking rubber stamp with any name on it in neat style for any single cloth-bound book by above authors. CHAS. C. CATES, Decatur, Texas.

Twenty-five 1 x 1, fifteen 1½ x 1½ minerals, ten 3 x 2 shells, moss, twenty-five Indian arrowheads, stamps, coins, tags, post-marks, "World's Wonders," "Ten Years' Travel around the World," and ten other bound books, story, stamps and other papers, watch, a foot-power printing press and other articles, for a 42-inch bicycle, stamps, type, or anything else. F. N. MASSOTH, Jr., Hanover Center, Ind.

I will give package of mixed Pansy seed, package of other mixed flower seeds, several hundred silk cocoons (steamed) with a few hints on raising silk, different kinds of curiosities, and a gold watch worth $10, for a printing press suitable for publishing a magazine size of EXCHANGERS' MONTHLY (or larger), with instructions and complete outfit, or I would take any other reliable article or goods. L. H. COOMBS, Arcadia, Valley Co., Neb.

Analcite, apatite, arsenopyrite, apophyllite, azurite, barite, brucite, boltonite, byssolite, calcite, cerussite, chalcopyrite, cryolite and chalybite, celestite, chabazite, franklinite, hematite, heulandite, leucite, magnesite, natrolite, nuttalite, pyrite, pyromorphite, drusy quartz, rutile, selenite, stilbite, radiated and crystalized, sphalerite, scapolite, vesuvianite, vivianite, vermiculite, and arrowheads, for crystalized minerals, works appertaining to mineralogy, a dictionary or encyclopedia. F. J. LEWIS, 710 N. 22d St., Phila., Pa.

Wanted, autograph letters and signatures of Henry Clay, Horace Greeley, Sam. J. Tilden, J. C. Calhoun, John Adams, Th. Jefferson, James K. Polk, Andrew Johnson, and many other noted persons, whether living or dead. Will give in exchange for the above, V-nickels without cents, colonial cents, U. S. and foreign coins; rare U. S. postage, revenue and medicine stamps, also foreign stamps, confederate bills of 1861, '62, '63, '64, wild-cat currency, and over a hundred autographs. Write me. WILLIAM FISHER CORNELL Kalamazoo, Mich.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

Pre-historic Man.

ARCHÆOLOGISTS are now of the opinion that the human race appeared simultaneously at several places. All attempts to establish a connection between American aborigines and the several races of the eastern continent have failed. History teaches us that America was possibly discovered and afterwards peopled by the Northmen from the east or some Asiatic tribe from the west, by way of Bering Strait. Nearly all countries have had their pre-historic inhabitants, such as the Swiss lake-builders, the cave-dwellers of Scandinavia, the aborigines of England, etc. In these places relics of the stone age are found similar in shape to those found in America; but a great difference in their workmanship is distinguishable. The works of the mound-builders are confined to the interior of our continent, and all archæological research has failed to find their landing-place or discover remains of a journey from any coast. Ancient ruins of the Aztecs and Soltecs are found in British Columbia and the northwestern part of the United States. Also of their subsequent settlements in Arizona and their journey through Mexico. But if they ever had a landing-place on this continent, all efforts to find it have proved fruitless. Remains of the mastodon and other extinct animals have been found with stone arrow and spearheads in and about them, showing that they were contemporary with the ancient American. This proves that the continent was inhabited at a very early date; but whether the mound-builders or Aztec appeared simultaneously with man in Asia is merely a matter of conjecture.

WE would be pleased to receive articles and notes on Archæology from young collectors as well as the more advanced.

THE great sculptured stone of Montezuma, in Mexico, is a striking proof of the extent to which granite can be sculptured with stone implements. Gama, in his work describing this stone, states that ten thousand Indians were employed in transporting it to its place, where it was sculptured by thirty workmen with stone axes.

PAPERS copying from this department should give proper credit.

New Minerals.

ARMINITE, is another new name given by Weisbach, to a hydrous sulphate of copper, found in porcelain-jasper from Planitz, near Zwickan. An analysis by Winkler yielded: So_3 24·43, CuO 56·81, Fe_2O_3, Al_2O_3 0·35, CaO 0·56 = 82·15.

A NEW variety of kobellite is mentioned by H. F. and H. A. Keller, from the mines of the Lillian Mining Co., Leadville, Colo. The unaltered mineral is of a steel-gray color. It is fine grained, crystalline, with a metallic luster, and gives a black streak. An analysis of the pure material yielded: S 15·23, Pb 44·08, Bi 33·27, Ag 5·66, Cu trace, undissolved residue 0.15. Formulæ, $3(Pb, Ag_9) SBi_2S_3$.

ARGYRODITE, crystallizes in the monoclinic system, crystals are small, and often united in rounded groups. Sp. Gr. = 6·093 6·111; hardness = 2·5; luster, metallic; color, steel gray with a tinge of red on fresh fracture, tarnishing on exposure; streak, grayish black, shining: no cleavage, rather brittle. An analysis by Winkler afforded: S 17·13, Ge 6·93, Ag 74·72, Fe 0·66, Zn 0·22 = 99·66. Argyrodite occurs as a crust upon marcasite and siderite, or again on argentite; other associated minerals are sphalerite, galena, pyrite, chalcopyrite, and also the silver minerals pyrargyrite, polybasite, and stephanite. The locality is the Himmelfurst mine, near Freiberg. This mineral contains Prof. A. Weisbach's new element Germanium.—A. J. S., No. 188, Vol. XXXII.

ADVERTISEMENTS.

When answering advertisements found in this paper, please do us a favor by mentioning "Saw advertisement in THE EXCHANGERS' MONTHLY."

BARGAINS IN MINERALS.

My list of bargains in last number having proved so successful, I continue them this month with some changes.

SELENITE,
ROSE GYPSUM,
WAVELLITE,
CYANITE,
COLUMNAR GYPSUM.

10 cents each.

POLISHED JASPERIZED WOOD,
STAUROLITE CRYSTALS,
HYALITE,
SATINWOOD LIMONITE,
POLISHED AGATES.

25 cents each.

FIBROUS MALACHITE,
AZURITE CRYSTALS,
NATIVE GOLD,
NATIVE SILVER,
NATIVE COPPER.

50 cents each.

PRECIOUS GARNETS,
CINNAMON GARNETS,
CUPRITE CRYSTALS,
ENG. CALCITE CRYSTALS,
IRON GARNETS.

75 cents each.

For sale by

A. CHAMBERLAIN,
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2 eagle cents of 1857 and '58,	.05
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2 alligator teeth,	.05
1 1883-nickel with shield,	.11
50 varieties of foreign stamps,	.06
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Box 314, Delavan, Wis.

JOSEPH WIGGLESWORTH,
DEALER IN

INDIAN ARROWHEADS,

WILMINGTON, DELAWARE.

Many collectors endeavor to form a cabinet or collection by selecting a few choice specimens from the different countries or states. To these I can offer a varied list of localities for selection.

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5 to 30 cents.

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Envelopes, size 6, business size,	.35	.80	1.50	2.50
Business Cards,	.35	.75	1.25	2.00
Statements, size 5½ x 8½,	.35	.80	1.50	2.50
Bill Heads, 6-lines,	.40	.80	1.50	2.50
Bill Heads, 14-lines,	.50	1.10	2.25	4.25
Shipping Tags,	.35	.75	1.25	2.00
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Every description of Job and Commercial Printing neatly done at the Lowest Prices. Send for estimates on any printing you may need.

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Speciality of sheets of stamps on approval, to parties furnishing satisfactory references or deposit. Address

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I want a good agent in every town-school to sell stamps from my sheets, send a good reference and receive one. 25 to 50 per cent commission allowed to agents, all stamps are marked low. Address, F. N. MASSOTH, Hanover Center, Lake Co., Indiana.

SPECIAL COLLECTIONS,

Illustrating the Ores and Metallic Minerals. Minerals used in the manufacture of chemicals, drugs, porcelain, and other household ware, the ornamental and mechanical arts, and those used for heat and light. The Metallurgy of any metal put up to order. 15 specimens $1.50.

THOS. S. ASH,

126 CHESTNUT PLACE, WEST PHILADELPHIA, PA.

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W. H. BEAN, Naturalist, Lebanon, O.

100 assorted foreign stamps for only 4c.; 50 all different 4c.; post-paid. Address
F. N. MASSOTH, Jr., Hanover Center, Ind.

STAMPS!

Send reference and receive by return mail an approval sheet. Price list of mineral specimens sent free. Address LANDERO & CO., ENGINEERS, P. O Box 34, Guadalajara, Mexico.

READ THIS!

ANGOLA, N. Y., July 20, 1886.

A. CHAMBERLAIN:

Dear Sir:—I received the box of Arizona specimens that you sent me on approval this morning. They are indeed fine I am very much pleased with them. They are indeed showy specimens. I was also pleased with the other specimens sent. I will show your box to others and probably get you some customers.

Yours respectfully,
MRS. A. J. OATMAN.

THE ARIZONA MINERAL COLLECTION.

PUT UP BY

MR. WILLIAM NIVEN,

Late-Assistant Commissioner, Arizona Territory, World's Fair, New Orleans.

ONLY 50 CENTS A BOX.

This is the most attractive collection that has yet been put in the market, and should meet with a large sale. It consists of 12 specimens packed in cotton in a partitioned box, each accompanied by a printed list giving name of mineral, composition, etc, together with an engraving of the Natural Bridge, Chalcedony Park, Arizona Territory, which is made entirely of the wood of which this collection contains a piece Each box contains:

FLUORITE.
FREE GOLD,
CHALCOCITE,
MALACHITE,
CHALCOPYRITE,
SMOKY QUARTZ,
NATIVE COPPER,
JASPERIZED WOOD,
AZURITE CRYSTALS,
CUPRITE ON LIMONITE,
ARGENTIFEROUS GALENA,
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100 mixed foreign .... 3 c.
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Sheets sent on approval to parties furnishing good reference, 25 to 50 per cent. cash-commission. My stamps are marked lower than any other dealers. Address,

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Is a large magazine devoted to Natural History and collecting in general. Send 60 cents for a years subscription to

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and receive 2 fine Indian arrowheads as premiums.

THE EXCHANGERS' MONTHLY

[Entered at the Post Office of Jersey City, N. J., as Second Class Matter.]

VOL. I. JERSEY CITY, N. J., OCTOBER, 1886. NO. 12.

Experiments with Lycopodium.

By T. O'Conor Sloane, Ph D.

Lycopodium is a fine powder, the seed, or more correctly the spores, of a club moss. These are members of a curious family of cryptogamous plants that, from the demand in commerce for the spores, have a certain importance. They form the living representatives of a once numerous and important group of large trees, now mostly extinct—the lepidodendrons and sigillarias. In the carboniferous ages these plants grew to immense size, and it is supposed that in the moist air laden with carbonic acid gas their growth was extremely rapid. From them and their associates the beds of coal that we now burn, anthracite, bituminous, and cannel, were formed. To-day this mighty series has dwindled into insignificance, the survivors being little more than herbaceous in habit. Long strings of some of its varieties are sold for Christmas decorations, the stems being tied together.

The spore cases are comparatively large vessels. Exactly how the germination takes place is unknown. Each spore case contains a quantity of the spores—microscopic bodies that, collected, form the finest conceivable powder, of a yellowish brown color. So fine and smooth are the spores, that a bottle half full acts almost as if filled with water. The lycopodium, when the bottle is inclined and jarred or shaken rapidly, slides down to a level, or nearly level, surface, and, on more active agitation, a species of waves or ripples can be produced on the surface.

On microscopic examination each grain is found to approximate to a spherical shape, with three faces meeting pyramidally on one part of its superficies. Several interesting experiments can be performed with this substance.

For a long time past it has been used in theaters for the production of flashes of light. Owing to its fine state of division and its resinous nature, it catches fire with great readiness when disseminated in the air, and produces much the same effect that a sudden inflammation of a large body of gas would exhibit. Its fineness is such that, practically speaking, it assimilates itself to the gaseous state. If a small quantity is placed on a card and shaken out over a candle flame, bright, lightning-like flashes will appear. By proper management, absolutely explosive mixtures of lycopodium and air can be produced. In these respects it reminds us of the dust of coal mines and flour mills, to which so many fatal explosions have been due.

By virtue, probably, of its resinous nature, it is moistened by water only with considerable difficulty. Spread over the surface of water, it forms a coating that does not for many hours become wet, and that prevents other bodies from coming in contact with the fluid. It does this, not by acting as a membrane, but by sub-dividing the surface of the water so as to magnify the effects of the surface tension. It also seems in a certain sense to increase the coherency of the surface, and to make it tend to move all at once, if an effort is made to disturb it.

Having sprinkled some over the surface of water in a glass, the experimenter may immerse his fingers in the fluid. He will notice no difference in the sensation, the water feels as cold as ever, but as his finger descends it carries with it the coating of lycopodium, that now, like a membrane, wraps itself around his finger, and adheres to it under the water. The effect produced is sometimes quite peculiar, the finger appearing enveloped in ice, and magnified by the shape of the glass. On withdrawing it, however, it will be found perfectly dry. The adhering powder can be shaken off on the surface of the water. As long as enough powder is kept upon the surface of the water the immersion can be repeated over and over again. The finger will never become wet. The lycopodium divides the water into such small areas that, in virtue of its surface tension, it is held back and away from the skin. If all the dust is drawn down, and the water comes in contact with the unprotected finger, it will become wet above the lycopodium.

One curious illustration of the efficacy of the powder in preventing contact between a solid and liquid may be obtained by lowering a coin into the water. The coin may rest upon a bent wire or be lowered by a thread. The coating of lycopodium will close over and envelop it as it decends, and it can be lowered down to the bottom of the vessel and again extracted perfectly dry. It is just as if it were inclosed in a sac of India rubber.

From a vessel of clean water drops may be taken and allowed to fall gently on a somewhat thickly coated surface of water. They immediately form into spheroids, not coming in contact with the water below. They can be rolled about and against each other without coalescing, as, curiously enough, there is a species of adherence that obtains between the lycopodium and the water, so that the drops become coated with it. If a piece of glass is dusted over and a drop placed on it, the rapidity with which the drop rolls about, as the glass plate is inclined, is quite striking. In a lantern this may be shown with good effect, the projected image of the drop flying across the field of view like a pistol ball.

The experiment of floating needles may be repeated on a lycopodium-coated surface with magnified effect. Pieces of wire of some thickness, steel pens, and the like, float upon the surface, just as they do on mercury. Here again it may be noticed that the actual depression is quite small. The surface is but slightly affected by the weight resting on it.

The coated surface forms an admirable field for the display of magnetic figures. A tray of paper may be used to contain the water. It must be made water-proof by treatment with shellac or melted paraffine. The paraffine from a candle melted over the surface by the heat of an oven, or by being held in front of a fire, will suffice. A shallow layer of water is placed in it, and the tray rests upon the poles of a powerful magnet. It is dusted with lycopodium, the excess is blown off, and iron filings dropped on the surface from a considerable height. The filings may need a little assistance by jarring, but they will often, without it, arrange themselves in a series of magnetic curves. At the poles, where the attraction is strongest and where most filings accumulate, the magnet draws them down, depressing the surface quite curiously, but not with power enough, under ordinary conditions, to break through the film. It is a case of two forces being insufficient to overcome the surface strength. Here gravity and magnetism co-operate, but cannot break through.

Three miles from Madison, N. Y., is a curiosity exciting widespread attention. It is a spring the water of which is as cold as ice and clear as crystal. In digging down two or three feet, it was found that everything the water touched was crystalized. Leaves, grass, feathers, and grasshoppers can be clearly traced in the beautiful white crystalization. Large numbers are carried away daily.

Geology the Standard History.

By ARON HAMBURGER

GEOLOGY is one of the most interesting of the natural sciences.

Its history of long past ages and their inhabitants is exact and impartial, its discription of extinct species of organic life accurate. By the fossil remains so often found we obtain a far better idea of an extinct plant than by reading the description given by a botany or natural history.

In rocks of the different ages we find many traces of prehistoric man. His foot-print is seen in the rocks of many formations and other traces of him are daily found. But the foot-prints of prehistoric men and animals are not the only foot-prints seen. On every hand we find undeniable foot-prints of the Creator and truthful verifications of the Bible. Many so-called scientists and professed atheists try to use their knowledge of geology in disproving the truths of the creation and the existence of a Creator, but their geology serves to prove the record of the flood as recorded by the Bible rather than to disprove them.

The true scientist sees "Providence in all things" and the hand of God in all of his works.

The Orthoceratite.

By FRANKLIN C. JOHNSON.

THE Orthoceratite (straight horn), is one of the most common fossils found in the Silurian rocks. It had a long straight shell, which was divided into chambers. These chambers were made of a right size to accommodate the animal. but as it grew in size, the first chambers became too small, so it moved forward, extending its shell as it moved, and partitioning off the chamber thus formed from the one just left by a hard shelly wall. In this manner a large number of these chambers were made, each one being larger than the one behind it. Many orthoceratites have been found with a shell 30 feet in length. The chambers in the shell of the orthoceratite were connected by a tube passing from the first chamber through to the last. They obtained their food by reaching out with their long arms, of which they had a great many.

An Effective Madstone.

MR. J. H. BLACKWELL, a prominent citizen of Reidsville, N. C., was bitten some days ago by a mad dog. The wound was quite serious and he soon exhibited all the symptoms of hydrophobia. Mr. Blackwell, acting upon the advice of friends, started in quest of a madstone, somewhat celebrated for its remarkable cures in that part of North Carolina. He found a fragment of it in the possession of a family residing in Pearson County.

It was at once applied, and it adhered with great tenacity to the wound until it had absorbed all the virus it was capable of retaining, when it fell off. It was then placed in warm water, when a greenish substance left the stone and appeared on the surface of the water, which was taken as evidence that the virus had been discharged. Again the stone was applied to the wound and again it adhered for some moments until it again fell off. This operation was repeated till the sixth time when, the madstone refusing to stick any longer, the patient was declared cured by its owner. Mr. Blackwell returned home and has since felt no pain in the wound, nor does he nor any of his friends entertain the slightest apprehension of hydrophobia.

Receipts.

Pure Cistern Water.—A teaspoonful of permanganate of potash will remedy an impure cistern.

To Prevent Mildew from Affecting Wood.—A solution composed of alum two pounds, water sixty pounds, blue vitriol two pounds, gelatin one pound, acetate of lead one-half pound, thoroughly mixed, will prevent mildew from affecting any wood, clothing, fabrics, etc.

Chinese Cement —A cement very much used at the present day in China and Japan is made from rice. It is only necessary to mix rice flour intimately with water and gently simmer the mixture over a clear fire, when it readily forms a delicate and durable cement.

THE
EXCHANGERS' MONTHLY.

PUBLISHED BY
THOS. CHAMBERLAIN, JR.

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Per Column	1.25
Per Page	2.00

Address all subscriptions and communications to,
THOS. CHAMBERLAIN, JR.,
284 Pavonia Ave., Jersey City, N. J.

WITH this number we complete the first year of our Monthly, and reach a point which has proved fatal to more than half the amateur publications that have started. Few amateur periodicals ever reach their second year, therefore we are happy to be able to state that not only are we going to continue, but we are going to increase the size of it four pages, by giving it a cover, and increase the attractiveness of it by giving it an almost entirely new dress. In spite of these changes we intend to keep the subscription price at the same low figure which has made it a success, 25 cents a year. Now, what have we given our subscribers in the first year for their money?

We have given them 96 pages of reading matter, 24 pages of which were ads., 9 pages were exchanges from which alone a person ought to have made exchanges enough to have repaid him for the money invested, 5 pages were recipes such as are sold every day for from 5 to 25 cents apiece. The other 58 pages was filled with interesting articles, more than half of which were original, and two illustrations of interesting places.

One thing that has pleased us more than anything else, has been the unsolicited endorsements our Monthly has received on every side, some of them from our best mineralogists.

Another thing which has pleased us and our friends, is the workmanship displayed on our Monthly, and its freeness from mistakes. In this respect we are unsurpassed by any and are equaled by few. Some of the monthlies published, which charge from 60 cents to $1 a year, are so full of mistakes that it is a wonder their subscribers do not throw them aside in disgust. By this we do not mean to say that we are entirely free from mistakes, but what there is are few and far between.

Still another thing that we would call your attention to, is the fact that the EXCHANGERS' MONTHLY has, in every instance, been issued on the first day of the month, and therefore our subscribers has not been subjected to those annoying delays, "double numbers," etc., with which almost any other amateur publication has more or less disappointed its readers.

We would return thanks to all who have been instrumental in making this Monthly a success, and hope we shall continue to receive their donations, whether in the shape of subscriptions, advertisements, or articles, all of which will be fully appreciated.

Again thanking one and all, we close our first year, and hope you will all wish the "EXCHANGERS' MONTHLY" a Happy New Year.

WE make no announcement this month of the articles to appear in next number, on account of being undecided which to select from a large list of interesting articles we have on hand. But this you may be sure of, it will be the most interesting number that has yet appeared.

WE would call the attention of advertisers to the fact that, with the next number, we double our rates. We will, however, receive ads. until the 20th, at the old rates, so send in your ads. early and receive the benefit of our cheap rates for the last time.

THE only case known of native iron from the sandstone formation, occurs in the Triassic shale and earth, about 3 miles east of New Brunswick, N. J. An analysis yielded 76·12 per cent. of metallic iron.

EXCHANGES.

Any subscriber can insert an Exchange as many times as he wishes. Other than subscribers are limited to four times a year.

Minerals to exchange for minerals. Send lists giving size of specimens. FRED. Y. COZZENS, Leominster, Mass.

Fine perfect arrowheads and Indian pottery for fine minerals of large size. W. P. RATHBONE, JR., Box 753, Parkersburg, W. Va.

I will exchange an old U. S. Postal Card for every geological or mineral specimen sent me. LEE E. BRIDGE, Bonaparte, Ia.

I will exchange shells, minerals, birds' eggs, tin tags, and stamps for foreign coins. W. T. MILLER, Box 45, Parkersburg, W. Va.

Vol. IV of "Golden Days" for the best offer of coins, minerals, Indian relics, stamps, etc. E. W. THOMAS, JR., Box 2274, Ocean Grove, N. J.

Fine arrowheads, birds' eggs, and foreign stamps to exchange for minerals of large size and named fossils. WILL T. MILLER, Parkersburg, W. Va.

A piece of fossil coral and three fossil shells for a V-nickel without cents. Or either coral or shells for a curiosity or relic. B. C. ELLSWORTH, Eldora, Iowa.

A buffalo horn by mail for every 300 U. S. and departmental stamps sent me. A buffalo tooth for 25 stamps. A. L. RAYNOLDS, Omio, Emmons Co., Dak.

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Arrowheads, tin tags, birds' eggs, minerals, fossils, Moundbuilders' and Indian relics, for coins or V-nickles without the word cents on it. H. T. UPSON, Parkersburg, W. Va.

U. S. and foreign stamps to exchange for departmental stamps. All answers must contain a stamp for return postage. W. H. BROOKS, JR., 713 Corinthian Ave., Phila., Pa.

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Will exchange books of all kinds for anything antique and curious, autographs, letters, etc Send list of what you have with your price. BOOKS, 91 Dearborn St., Chicago, Ill.

Minerals, fossils, sand, fresh water, and marine shells to exchange for same, Indian relics or scientific books. Send for list stating what you have to exchange. WM. W. BUXTON, Milo Center, Yates Co., N. Y.

A fine silver watch, also a good nickel one, for minerals, curiosities or Indian relics of any kind. Send stamp for my list of useful articles that I will give for curiosities, etc. All letters and cards answered. F. A. THOMAS, Mexico, N. Y.

Ten revenue stamps for every 2-ct. brown, 1869 issue, of the U. S. Three $5 and three $10 Rhode Island bills dated 1807, for the best offer of U. S. stamps or for 25 special delivery stamps. CHAS. E. FRICK, 1019 W. Lehigh Ave., Philadelphia, Penn.

I will give a fine mineral or fossil for any of the following U. S. stamps: any executive, justice, state, navy, or agricultural department. Two for any seal stamp. One for any from Bosnia, Bolivia, Bremen, Brazil or Honduras. F. R. STEARNS, Elkader, Iowa.

I have specimens of massive hornblende, buhrstone, calc-spar, brown jasper, etc., and copy of the American Naturalist, Travels and Adventures of Baron Munchausen, birds' eggs and stamps to exchange for minerals List on application. FRED. H. BLANCHARD, Tunbridge, Vt.

A pair of 10½ Henly roller skates, good magic lantern and outfit, and a large lot of birds' eggs, for blank cards, type, any kind of printing material, or an organette (or similar automatic instrument). Correspondence desired but no postals. JAMES ANDERZEN, College Springs, Iowa.

Wanted, No. 8, Vol. I, EXCHANGERS' MONTHLY. Will give 25 cents worth of minerals, fossils, shells, eggs or woods, for same. Also want minerals, fossils and shells in exchange for same. Will exchange for U. S and revenue stamps, or 8th edition Scott's album. D. H. EATON, Woburn, Mass.

Cutter's Anatomy, Physiology and Hygiene, Scudder's History of the United States, Brooks' Higher Arithmetic (new), Robinson's Elementary Algebra (bound in calf), and a geode of yellow quartz crystals for best offer of fine minerals. Will exchange separately or all together. Collectors please send lists. A. HAMBURGER, Box 1, North Wales, Pa.

Will exchange or purchase autographs (signatures only) of noted men of this and other countries. C. S. A. generals especially. I offer in exchange coins, stamps, sea specimens, fossils, minerals, prepared woods, birds' eggs, other autographs, etc. Drop a postal, with address, stating what you have for exchange. JAS. T. DENNIS, Princess Anne, Md.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Delaware, to whom all articles pertaining to the subject should be sent.

The Moundbuilders.

SINCE the placid bosom of the Chattahochee was first ruffled by a steamboat the interest of the passengers have been excited by a beautiful mound that stands on the crest of the eastern bank at Woolfolks bend, some fourteen miles below Columbus. Who the warriors were that raised its proud crest heavenward no man knows. Even the Indians could give no account of it, and who left behind no history of their race affinities, only those silent monuments of patient industry. It was evidently the work of that extinct race known as the Moundbuilders. Though this mound has long excited the wonder of the people, it was not until recent years that its hidden mysteries have begun to unfold to the lovers of archæological research. At first rumors gained circulation of wonders hidden therein and mercenary parties hastened hither; but when arduous labor with pick and spade was only rewarded by dry bones or ugly pots, they turned away in disgust, leaving further research to the antiquarians. The most successful of the latter class is Mr. G. W. B. McKnight. Most of the relics secured from this mound consist of pottery, most of which is of unique design with some attempt at decoration. The largest vessel is in shape somewhat like a carboy, with shorter neck and mouth more flaring. On one of the smaller pots a copper dish was snugly fitted as a cover, and in it were a number of beads, suggesting the possibility that it had once served some ancient belle as a jewelry case. Other pieces in design resemble the modern cuspadore, and others still are shaped as the regulation pot of this day. He also secured several stone pipes, four fleshers, two axes, a medicine stone and a few arrowheads. This mound is about twenty-five feet high and forty feet in diameter at base. It commands a magnificent view of the river as well as the surrounding country, and may possibly have been used by the builders as a signal station also, there being several other mounds in this section.—ATLANTA CONSTITUTION.

WE would now like to see the papers boom an Archæological Association. It would undoubtedly be of great benefit to its members. Start it going.

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